The Builder.

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"Canny Newcastle:" Social Science.

NEWCASTLE-UPON-TYNE is about nine miles from the sea, and the river Tyne is navigable to Blaydon, four miles above Newcastle, for vessels of 30 tons burthen. Large steamers and sailing vessels, drawing 15 ft. of water, can now discharge at Newcastle Quay, owing to the recent deepening and improvement of the river by the Tyne Commissioners. From the Registrar's Customs Return it may be stated that the tonnage of the port of Tyne is nearly as large as any in England, the tonnage being as follows, viz., London, 4,136,000; Liverpool, 4,676,000; and Newcastle, 4,141,000.

The population, as estimated by the Registrar-General, is 133,000. The Parliamentary boundary includes an area of 5,325 acres, the circumference being sixteen miles. This comprises an open space of ground belonging to the Corporation, to which the public has access, called the Town Moor, and which measures about 1,200 acres. With this it is to be hoped something effective will be done.

The town has greatly increased of late, as is indicated by the census, the return for 1851 showing a population of 87,000 only. Owing to the very rapid growth of the town, it was found necessary, in the year 1853, to extend the boundaries of the borough so as to include a number of outlying townships, which up to that period were beyond the jurisdiction of the Corporation as far as regards sanitary measures, many of the streets being undrained and unpaved, as is the case with other towns beyond the original boundaries. Since that date some progress has been made in providing what was necessary in this respect, but very much still requires to be done to render the borough as salubrious as it might be, such as the reconstruction and proper arrangement of sewers, the repaving of old thoroughfares, and the utilisation of the town sewage, so as to prevent its discharge into the river. We are informed that within the past three years about 150 new streets have been drained and paved, and that thirty old streets have had their drainage reconstructed. The newer-built portion of the town is partly furnished with water-closets; but in other parts there are only filthy open pits, or no provisions at all.

Leaving this part of the subject for a time, we may mention with reference to street improvements that Grainger-street, one of the most central streets in the town, is in course of extension southward to the railway station. This street is 60 ft. wide, and its additional length will be 260 yards. A new street is now being laid out from Pilgrim-street to Carliol-square, a length of about 170 yards. In the formation of these streets a great deal of closely-built property has been removed, which should admit of arrangements tending to the health of the localities surrounding them. The great fire in 1854, which consumed a large amount of old property on the quay side, has cleared the way for the erection of ranges of offices, and places of business, and open streets in place of the narrow "chares" formerly existing there. Closely adjoining the above is the Sandhill, which has also been improved by the removal of ancient timber buildings, the widening of the street, and the erection of substantial houses. At the Quayside a mass of old and ruinous property, near Sandgate, has been pulled down, and the Corporation has recently obtained powers for other street improvements in various parts of the town, the effect of which, if properly effected, will be to remove much old and closely-packed property, in addition to facilitating street traffic. The formation of two parks on the town moor, to be laid out ornamentally for the public recreation, is also talked of, and should be pressed on as a measure of great importance.

Our readers have been kept informed from time to time of architectural and artistic works in the town, and recapitulation is unnecessary. The neighbourhood of the railway station, one of the noblest, by the way, in external appearance in the kingdom, is becoming the finest quarter of the town, the monument to George Stephenson and the Roman Catholic Cathedral helping the *ensemble*. The latter has lately received an addition and an improvement in the shape of a little tower, with spire, for a staircase, connecting with the church the residences of the clergy. The effect of it is particularly agreeable. Close to the station a large and costly building is in course of erection for the Institute of Mining and Mechanical Engineers, from the designs of Mr. Dunn, of Newcastle. It will include a fine hall, lined with stone, and with an open roof. The style of the exterior is Italian Gothic. A want of agreement between the side and end of the building struck us, but it would be unfair to offer upon it any conclusive opinion in its present incomplete state. It is obviously a work to which considerable attention is being paid: stone is the material used externally, and a little variety of colour, not too violent, as is sometimes disagreeably the case, is being introduced. A handsome building is in course of erection at the corner of Mosley-street for the National and Provincial Bank of England. Our readers have heard of the restoration, under Mr. G. G. Scott, of the well-known Church of St. Nicholas, prototype of Wren's Church of St. Dunstan-in-the-East, and which was for some time in a ruinous and threatening state. It is now apparently sound and substantial, though the use of iron ties in stonework always seems to include a certain amount of risk *in futuro*. Local admirers of the church complain of an altered effect, caused by a change in the character of the new ashlar facing introduced; but without completer knowledge of the circumstances than is possessed by those merely looking on outside, comment would probably be unjust. In restorations of old buildings, difficulties scarcely known to any but the architect have often to be weighed and overcome.

The stonework of the ancient Norman castle which gave the place its name, is greatly decayed at the joints, in some parts to the extent of several inches. This produces a picturesque effect, and, the walls being very thick, does not at present interfere with the stability of the structure. It necessarily, however, admits a great quantity of water, and decay goes on with increasing rapidity. Judicious pointing with black mortar, so as not to destroy the appearance of antiquity, would add a hundred years to the possible duration of this interesting pile.

Near the county-court, where the Health Department of the Social Science Association held its sittings, two old houses, occupying a prominent position at the junction of roads, have been faced with terra-cotta, somewhat elaborately, including gables, strings, and window-dressings; and, the old flank walls remaining, the front suggests what used to be vulgarly called a "dickey," or sham front. The material, manufactured by Harriman & Co., of Blaydon-on-Tyne, seems good, and has capabilities; but the architectural and chromatic combinations are not particularly successful. The main cornice, while all the rest is light, is of a dark chocolate colour, which seems to cut off all above it from the part below.

Let us now, however, look in, with the mind's eye, where the Department is sitting, and record something of what was written and said there touching the progress, condition, and requirements of the town.

After the reading of Mr. J. Blackburne's paper on the Utilisation of Sewage, which we have already printed,* observations being invited as to the drainage of Newcastle,

Mr. Godwin, as a stranger, said the aspect of the river Tyne was something terrible, and showed a want of attention on the part of the corporation on this very question of sewage. It seemed to him that the system of drainage pursued in Newcastle was much the same as had been followed for many years, and was quite unworthy of the town, either in respect of its wealth or intelligence. He had reason to believe that the surveyor of this town was very likely to place some scheme before the ratepayers, and he respectfully hoped that the people would in the fullest and most candid manner, irrespective quite of the money question—the health question being of much greater importance — examine carefully any proper scheme that might be laid before them. They must not look to obtain a large sum for the use of the sewage at first. They should rather be content to get rid of it at the smallest possible cost.

Mr. Alderman Bell, who had presided over the deliberations of the section during the greater portion of the discussion, at the close of the debate, reverting to these remarks on Newcastle, said he did not quite understand the speaker when he said they were going on just as usual. If he meant the town had formerly been going on well, he was glad to hear a stranger say it was continuing in the same desirable course; but if Mr. Godwin meant that the governing body was neglecting its duty, he must take exception to his remarks. Without having the figures at hand he would not quote statistics in refutation of the suggestion, but he would see that information was submitted to the congress to show that Newcastle had not been idle in sanitary matters during the last twelve years. Newcastle was an extremely difficult town to deal with. Although it would be easy to collect the sewage at one point, it could not be dispensed beyond the town to the land except by first raising it some 300 feet.

At a subsequent meeting Mr. Sheriff Gregson objected to what had been said, and maintained that Newcastle could favourably compare with any town in the kingdom. The sewerage was not defective; 90,000*l.* a year was expended on a perfect system of scavenging of nightsoil which never went into the sewers; and steps were being taken to intercept all the sewers on

* See p. 783, *ante*. For other notices of proceedings of Social Science Association in Newcastle, see pp. 777, 778, 801, 802.

one side of the town, instead of allowing the refuse to be discharged into the river. Under these circumstances, it was too bad to raise such objections. Mr. Godwin, in reply, said he had no desire to prove the Town Council was in the wrong; but only to impress upon the inhabitants that some further steps were absolutely necessary in regard to the sewage of the town. He found that large outlets in existence a dozen years ago were nearly in the same condition now as they were then, and others had been added of the same character, all below low-water mark. There were some fifty on the Newcastle side of the river in a terrible state; and it was of the utmost consequence that attention should be given to the matter, instead of rebutting statements of this kind by the assertion that the town was as well sewered as any town in the kingdom; because it was not so. He denied the necessity of raising the sewage 300 ft. before it could be transferred to the land; that evidently was a mistake. On another occasion the speaker went further into the subject, and referring to a report made chiefly by Dr. Rutherford in 1866, asserted that if it had been attended to more promptly and more completely, there would have been many more living in Newcastle than there were at present, and a much better state of things existing. He was forced to repeat that there was a great deal yet to do in Newcastle. He had already taken the liberty of alluding to one or two places in this town where he had found the want of closet accommodation to be quite dreadful, and until they got provision of this sort nothing could be done, the want of it was a great difficulty in the road of progress, both moral and physical. Modesty was destroyed, habits of carelessness were encouraged, and the stories he heard on Friday afternoon from poor inhabitants of courts, if they were repeated, would carry conviction to the minds of the authorities of the necessity of a proper system of sewerage for the town of Newcastle. The town surveyor, he believed a very able man, had not yet begun to touch it, but had paved many of the streets, and had no doubt done a great deal of good in that way above ground, but had not gone down to the sewers. These latter must be attended to at once, if Newcastle was to be placed in a satisfactory condition. The condition of the children was also very bad. In the examination he had made, he spoke to not less than twenty children, of eight, ten, or twelve years of age, who knew nothing whatever of reading or writing, or had had the slightest instruction They appeared to be simply brought up to damage the community, for their own speedy death, or to fall into what was called the dangerous classes. Overcrowding had also had a most injurious effect upon the health of the people. Much undoubtedly had been done in Newcastle, but there were many parts of it which were still greatly overcrowded. In conclusion, he strongly urged the Town Council to appoint a medical officer of health for Newcastle; he was perfectly astounded to find that the town, with its many admirable buildings, had not such an officer.*

Mr. Michael remarked that it required no amount of observation from a stranger to notice on his entrance into the town its imperfect sanitary state, and in calling attention to the fact he and others would be pardoned, because they only desired to make the best return to the people of the neighbourhood for their hospitality. Now, opposite the principal hotel, where he was staying, the streets before the main door were a disgrace to civilisation. Three or four inches thick of dust had been accumulated for some days, and during the driest portion of the year in some of the streets there were pestiferous stenches. He quite agreed with what had been said as to the appointment of a properly qualified medical officer of health for the town, whose duty it should be to point out necessary improvements, and see that they were carried out.

Dr. Holland observed that with the existing sewage arrangements of Newcastle there were two very serious faults, which it might be desirable to point out. It ought to be remembered that the great object of sewers was the taking away of the filth from the town as rapidly as possible,—a defect in the Newcastle system,—and they knew that the sewers were also untrapped. So long as a large proportion of the population were allowed to live in single rooms, it was impossible for that population to be healthy. We were always giving off that which might at any time become the seeds of disease. Organic matter must be cast off; and unless, therefore, people could change their rooms—and the more they changed them the better for safety—they could not keep those rooms sweet. Unless a family could afford a house of certainly not less than two rooms, in order that one might be occupied at a time, then that family, living all together perhaps in one small apartment, could not possibly be in the enjoyment of really good health. He was, from careful consideration of the question, persuaded that in the end a working man would find it more economical to provide more rooms than one for his family.

Mr. Councillor T. P. Barkas, replying, observed that reference had been made to the ignorance of the children, but he thought if the children of Newcastle were examined with those of other towns, they would find that they were not more ignorant than the children of Manchester and other places. They were not, he strongly maintained, in this matter worse than their neighbours. Every endeavour had and was being made by the Town Council upon sanitary matters.

Mr. Rawlinson, the president, said they had not desired to unduly censure the Newcastle authorities in bringing before the meeting the special evils alluded to, but rather in order that by their being pointed out they might be speedily remedied. The last speaker had said that certain things in Newcastle were not worse than similar ones in other towns, but he did not think that that was the right style of reply to be given. It was satisfactory to learn that the town was now feeling the benefit of the work of progress which had been carried on during the last few years. When they saw that in this population of Newcastle 15,800 families, and he supposed that each family on an average would be composed of five individuals, when that vast mass of the population was crowded into tenements of one or two rooms they could readily imagine the result. From eleven to twelve o'clock at midnight was the proper time for investigation, and between those hours he would recommend members of the town council to visit the overcrowded parts in company with a police officer, and if they did not learn a lesson that would last them for their lifetime, he was afraid they were bad to teach.

A valuable paper was read by the Rev. Dr. Rutherford, on the

Public Health in Newcastle in 1866 *and* 1869,

the object of which was to show what excellent results had followed such sanitary improvements as had really been made. In the course of it he said,—"The vitiation of the atmosphere of dwellings, by over-crowding, is one of the most powerful causes of a permanently high death-rate; and a considerable increase of over-crowding seems to have been the great predisposing cause of the excessive mortality in Newcastle during 1866. Between 1851 and 1861 there was an increase of 21,812 in the population of Newcastle, and of 3,658 in the number of inhabited houses, being a house for every six persons added to the population. During that period the people of England increased 2,138,615, and the number of inhabited houses 461,466, or a house for every 4·6 of those added. Since 1861 the augmented accommodation for the estimated increase of population in Newcastle had, up to 1866, scarcely averaged a new house for every ten persons. In 1861 there were in the borough 13,979 inhabited houses, 588 uninhabited, and 330 building. The population was 109,108 persons, or rather less than eight persons to each inhabited house, being a larger number than in any of the large towns in England. From 1861 to 1866 only one house had been provided for every ten persons of increase in population. The number of houses built, or being built, in 1862, was 387; in 1863, 220; in 1864, 187; in 1865, only 108. This marked diminution in house accommodation for the rapidly-increasing population was followed by a great increase in the over-crowding of tenements, and by a death-rate only exceeded during cholera epidemics. The evil was increased by the removal of property occupied by the labouring population, for purposes of public improvement. Towards the close of 1866 a considerable impetus was given to house-building. Between August, 1866, and August, 1867, 232 houses were built; in 1867–68, 505; in 1868–69, 443; and from August, 1869, to August, 1870, 552. During the last three years, it must be stated, 1,500 houses had been built, a number considerably greater than had been built during the preceding seven years. This great increase in building operations has tended greatly to relieve the overcrowding which invariably expresses itself in a higher general and zymotic death-rate. The active, intelligent, and competent builder is thus one of our most efficient sanitary reformers. Nor has it been left to private enterprise alone to provide for the pressing necessities for the labouring poor. The comfortable and healthy homes provided by our local Industrial Dwellings Company form an immense contrast to the wretched abodes in their immediate neighbourhood, where death holds a perpetual carnival; and, for the sake of the moral and social results, it is to be hoped that the public spirit which has inaugurated the movement will not fail of its financial reward. In London, where attention has been paid to the wants of a locality, such dwellings have proved in every respect a success, and, as an investment, are justly regarded by many as one of the safest in the market. Nor is there any reason why it should be otherwise in Newcastle."

And again,—

"Poisonous emanations from decaying animal and vegetable substances are favourable to the production of diarrhœa; and it is impossible to resist the conviction that the wretched and filthy condition of the miles of unpaved streets then to be found in that sub-district were likely to be conducive to that excess. Leaving out of consideration the mortality from phthisis in the sub-district of St. Nicholas and St. John, which includes the deaths in the Infirmary, a comparison of the other sub-districts shows a death-rate from phthisis in Westgate and Elswick, during 1866, of 327; St. Andrew, 310; Byker, 278; and All Saints', 257, in 100,000 persons living. The principal conditions somewhat under municipal control, conducive to the development of tubercle in the lungs, are want of pure air, want of sunlight, and damp; and while each of these causes in varying degrees operates in every registration sub-district, it can scarcely be doubted that the high mortality from consumption, during 1866, in a sub-district like Westgate and Elswick, upon the whole the healthiest of the borough, was largely dependent upon its 155 unpaved and unsewered streets. The vapours of marshy lands are known to favour the deposit of tubercle, while it is often arrested by living on a dry soil and in a uniform and temperate climate. The mere removal of subsoil water by complete drainage, to some extent accomplishing both objects, was found, in our experience of 1866, in a considerable degree to diminish the mortality from consumption; and the enlarged and enlightened observations of Dr. Buchanan had established it as a sanitary law that the drying of the subsoil reduces the death-rate from consumption, and the experience of the west end of Newcastle since 1866 is not the least striking illustration of the truth of that law. The great reform in the street condition of that sub-district during the last three years can only be truly estimated by those who lived in its midst before. Justice cannot be done to it in any description. The melancholy mud ocean that enveloped so many hundreds of work-people's dwellings has given place to well-paved and sewered streets. The death-rate from diarrhœa and consumption has been steadily lessened; and when the street and sewer works are finished, the west end of Newcastle will bear favourable comparison with some of the healthiest districts in our large towns."

Mr. W. Crozier, C.E., gave the town excellent encouragement to proceed, by an account of

What has been done in Sunderland,

and the satisfactory results that have followed. Mr. Crozier said:—"There has been expended from the year 1851, up to the present date, in the borough of Sunderland, as follows:—

* The *Irish Builder* in a recent number says:—"Reverting to Mr. Godwin's remarks about the sanitary condition of the town of Newcastle-on-Tyne, we can bear him out in every particular. He has hardly spoken strong enough of the deplorable state of the low quarters of that commercially prosperous but sanitarily misgoverned nothern capital. We speak from personal knowledge ourselves and of repeated visits made to 'Canny Newcastle.' It is to be hoped that the action of the Social Congress held during the last few days in the town, will wake up the civic authorities of Newcastle to look closer after the courts or 'chares' as they are called in that town. Round about the Ouseburn quarter, along the quay side, and through the heart of the Sand Gate, there is at present and always has been, a plentiful supply of dirt, disease, and, of course, absence of pure air. We make those remarks in justice, and in confirmation of the speakers whose remarks we append."

On Sanitary Works (current).....	£288,000
Ditto Ditto (permanent), including Sewerage, Baths and Washhouses, Public Flagging, Private Flagging, Public Park, and pulling down old property under the Act of 1867	230,000
Private Sewerage Works.....	150,000
	£668,000

And upon works which can hardly be classed as sanitary works, such as markets, bridge, police stations, fire-brigade, &c., 79,270*l*. It is also proposed to expend 40,000*l*. more in pulling down old property, 5,000*l*. in public flagging, and 10,000*l*. in extension of the sewerage works. The only liabilities which remain to meet, out of this great expenditure, is a mortgage debt of 195,000*l*. As to the beneficial results obtained in the health of the town, these are clearly shown by the registered rate of mortality from the year 1841 to the present time, which is as follows:—In 1841, the rate of mortality was 26·89 per 1,000; in 1851 to 1858 (inclusive), 26·00 (before sanitary works were completed); in 1858 to 1868 (inclusive), 24·00 (after sewerage works were completed, but no dwellings dealt with); in 1869, 22·80 (ditto); in 1870 (half of year), 19·5. Since the paving and sewerage works have been carried out, there has also been a marked improvement in the cleanliness of the interior of the dwellings of the poor. The Public Lodging-houses have been closely and strictly attended, the necessary cubic space and all necessary rules rigidly adhered to, and the mortality in the lodging-houses is actually less than in the ordinary dwellings of the working classes. One matter which I am bound to admit is greatly in favour of the borough of Sunderland, is its abundant, constant and splendid supply of water, which never fails: every house and tenement in the borough has an ample supply, and yet, by a constant supervision exercised by the water company over the fittings used, and the detection of waste, the consumption for private purposes is only 13 gallons per head of the population, exclusive of water for manufacturing purposes, and rather under 20 gallons, including the same. In laying before you these few facts, I have referred, for the sake of showing what can be done, and what is often either left undone or too long delayed, to the boards and works of two of our largest local boroughs. But, as in all matters that are to be inquired into, it is only by such references that we can arrive at conclusions which may be useful hereafter for our future guidance, I trust that any remarks I have made will be received in the spirit in which they were intended,—that is, with no intention on my part either to condemn or approve the proceedings of any public body, who, I am sure, always do what they consider best for the interest and welfare of their different boroughs, but to endeavour to arrive, as far as possible, at facts, which may be of use in further carrying out sanitary reform, the yet great question of the day, but which, I am sorry to say, has, for the last twenty years, been more treated by words than works. After the works above enumerated have been carried out in a town, including the removal of uninhabitable, and the substitution of an improved class of dwellings, paving and flagging, baths and washhouses, public parks, an abundant and constant supply of pure water, and a proper system of sewerage, which, I am of opinion, is the best means of bearing away the soluble refuse of our towns, there is still left, before our sanitary works can be said to be complete, a great and important work to be done, viz., the disposal of our sewage matter, so as not to pollute our rivers and harbours, and to endeavour, if possible, to turn the matter so disposed to some profitable account."

We may not, however, devote to this subject more space at the present moment, further than to urge the authorities to give their serious attention to the suggestions that were made, and to offer them assurances which we hope they do not need that we have ourselves, in pressing upon them the necessity for further improvements, but one object in view,—the general welfare.

Flies.—A little attention on the part of the proprietors of dining-rooms would get rid of the evil of flies. In Belgium the butchers use laurel oil on their door-posts and window-frames, to such good effect, that the flies will not enter the shops. Is not this hint really worth taking?—*Food Journal.*

HOW WE BUILT A SHIP TO SINK.

The grave, pointed, and well-considered censure which the Court of Inquiry into the circumstances attending the loss of H.M.S. *Captain*, with 500 of her officers and crew, off Cape Finisterre, on the morning of the 7th of September, has had the courage to embody in the judgment read by the Judge-Advocate on the 8th current, deserves the very serious attention of educated men. That two admirals and seven captains of the Royal Navy should have so conscientiously discharged the judicial function to which they were summoned, unbiassed by any of those considerations of personal favour, or hopes of employment or promotion, that are thought to be forfeited by uncourtly remarks as to the conduct of administrative superiors, is in itself a circumstance that does them honour. The Court, after finding, as the public were fully prepared to anticipate, that no blame is attributable to Mr. James May and the other survivors of the *Captain* (the *pro formâ* prisoners before them) for the loss; and having put on record the somewhat bald statement that the vessel "was capsized by a pressure of sail, assisted by a heave of the sea," and that the "sail carried at the time of her loss (regard being had to the force of the wind and the state of the sea), was insufficient to have endangered a ship endowed with a proper degree of stability," emphatically state their conviction, which resulted in their minds from the careful consideration of the evidence. They remark that the *Captain* was built in deference to public opinion, expressed in Parliament and through other channels, and in opposition to the views and opinions of the Controller and his department; and that the evidence all tends to show that these officers generally disapproved of her construction. They state that while in the hands of the contractors who built the *Captain*, a grave departure from her original design was committed, by which the draught of water was increased, and her freeboard was diminished, by about 2 ft. And they add that her stability proved to be dangerously small, combined with an area of sail (under the circumstances) excessive. Thus far, indeed, the facts brought out in evidence admit of but little difference of opinion; nor would the late Controller, or any administrative officer of the navy, have hesitated to sign such a judgment. But the sting is to follow. The Court deeply regret that, if these facts were known and duly appreciated, they were not communicated to the officer in command of the ship; or, if otherwise, that she was allowed to be employed in the ordinary service of the fleet before they had been sufficiently ascertained by calculation and experiment. If this is not something like a verdict of manslaughter against the Admiralty, we fail to read the meaning of very plain English.

We are not of the number of those who will rejoice to make use of this grave and serious impeachment as a political weapon against the present Commissioners of the Admiralty, or the Government of which they form a part. For us, as for the majority of our readers, the interest lies far deeper than any party question. Neither would such an application of the blame be altogether just. The "yielding to the pressure of public opinion expressed in Parliament, and through other channels," can hardly be considered as a crime in itself. It is in the mode of such yielding that the gravamen consists. To introduce, experimentally, a pattern of floating battery which had very strong recommendations in its favour, while (whether truly or otherwise), it was generally believed to be opposed, rather to the private interest, or private hobbies, of Government officials, than to any structual law, was a departure from the rules of red tape that would find more to applaud than to condemn. But the sore point lies here. In so disregarding the opinion of the responsible officers, the Board of Admiralty was bound to guarantee their own action by the independent advice of some engineer of sufficient eminence to justify them in case of failure. Had this been done, the Admiralty would have been placed in a very different position. For, in the first place, the loss would not then have occurred. No such civil engineer as were those great men whom, a quarter of a century back, the Admiralty would have consulted in a similar case, would have allowed the *Captain*, as she was actually built and rigged, to go to sea. Secondly, if any disaster, even of a less unmistakable character, had occurred after such a step, My Lords would have been held blameless. They might have said with justice that the great importance of the subject, the military advantage to be gained in the event of success, and the favourable opinion of many skilful men, had convinced them that the experiment should be made. That, having so decided, against the wishes of their own constructors, they had taken the independent advice of a competent professional man, and that, on his assurance of the safety of the plan, they had ordered the experiment to be carried out. Further that, during the progress of the construction, this *ad hoc* consulting engineer had, from time to time, given the requisite attention, to see that the design was faithfully adhered to. Had this been done, no complaint would have been urged against the Admiralty in case of non-success.

It is very clear that it is not the present Board of Admiralty that is to blame for omitting, in the first instance, this obviously necessary precaution. That they should have allowed the *Captain* to put to sea, under all the circumstances that have since been made public, was, no doubt, a grave fault. Still the present administration did no more than allow the matter to run on in the groove in which they found it actually in motion; and it may be even urged that it is to expect too high a grade of education for merely political men to imagine that a First Lord would even entertain the idea that a vessel would be so designed and so built as to be liable to capsize. Such, no doubt, is the case. While, therefore, the absence of a proper consultative officer shows a want of proper precaution, which is in itself inexcusable, it is not so easy to say that Mr. A. or Lord B. is personally responsible for the omission. The evil, to a great extent, is chargeable to the system of our political administration. While we are content to commit military, naval, and technical matters to civilians and non-technical men for political reasons, we shall be likely to pay the price of the *Captain* at least once a year. Happy would it be for us if it were the material cost of the vessel alone that was in question, and not the loss of the very flower of the navy, the noble youths and stalwart sailors that were caught, in a moment, in that deadly trap.

In giving minute attention to the evidence brought before the Court, it is impossible to doubt that the main question was, whether purposely or not, kept in the background. Whether the cloud of words in which it was obscured arose from the fact that the witnesses purposely shunned the light, or from the circumstance that they had not that definite mechanical knowledge which would have enabled them to make the matter clear, we can offer no opinion. But the two separate (though intimately related) questions of height of freeboard and position of centre of gravity were so confused that as yet we have no hesitation in saying the public in general are quite unaware of the real cause of the loss of the *Captain*, and, consequently, of the fact that that loss was not what can properly be called accidental.

In all sea-going craft it is a primary necessity to provide that the vessel shall be able to right herself, in the case of being laid on her beam-ends in a sudden squall. The precaution against permanent overthrow is twofold. First, the centre of gravity of the vessel must be kept so far below the centre of gravity of the bulk of water displaced as to insure the vessel's floating, in normal circumstances, with the keel down and with the deck up. Secondly, the cross section of the vessel should be such as to make the resistance to overthrow the greater the more the vessel is inclined to her side,—greater, for instance, at an angle of 15° than at an angle of 10°, greater at 20° than at 15°. This requisite involves a certain height of freeboard.

It must, however, be borne in mind, that in calculations of this kind we have been in the habit of regarding floating bodies of homogeneous nature. In the case of a ship built altogether of timber, or altogether of iron, the height of the freeboard may be regarded as the primary element of stability. If the line of the hull be so designed that the displacement continually increases,—that is to say, that more and more water has to be lifted, the more the vessel heels,—we have a force ever acting in the right direction, and one which, under almost all conceivable circumstances, will get the better of the fitful fury of the wind. But if the vessel be constructed of different materials,—if the upper part, for instance, be of iron and the lower part of wood,—this righting process vanishes. The difference of the specific gravity of the upper part of the vessel, compared with that of the

water, is so great, that the effect of the increased displacement is disproportionately less than that of the leverage of the ponderous side-wall of the vessel. And as, under these conditions, the centre of gravity of the vessel approaches the level of the centre of gravity of the water displaced, stability becomes questionable, or altogether disappears.

Thus, in the height of the freeboard of the *Captain* we have but one of the elements of her floating qualities. She drew, we are told, 2 ft. more water than was designed. If the effect of this deeper draught had been to keep the centre of gravity well below the indicated line of safety, the greater draught would have been in her favour. The mere presence of a higher freeboard of heavy plates would not have compensated for the disadvantage of a centre of gravity varied to an equal extent. This matter must be obvious to any one who has swum a pail in a pond, but it has been kept out of sight in the evidence.

Nor has any light been thrown on the subject of the cause of the excessive weight. It was given, we are told, to strenghen the vessel; but the calculators were throughout so much in arrear of the construction that all this part of the affair is most unsatisfactory. We should like to know how the vessel was paid for, and what was the character of the specification. Eight hundred tons additional ironwork is no trifle. We know nothing of the schedule of prices of the *Captain;* but, according to Admiralty schedules with which we are acquainted, it would represent an extra cost of 36,000*l*. Are we to suppose that extras of this kind, amounting to more than 25 per cent. on the entire weight, were to be sprinkled in at the pleasure of the constructors, and paid for by the public, after the design had been approved, and the vessel ordered? In any case, the need of that independent and competent supervision, to the absence of which the disaster is directly attributable, is only the more glaringly shown by such admissions as these.

The object of the construction of the *Captain* was one of the highest military importance. As a floating battery, it is probable that the lost vessel was unrivalled. That for purposes of harbour and coast defence the freeboard might, with advantage, have been yet further reduced, had all idea of ocean navigation been abandoned, is more than probable. The idea of raising and lowering the vessel bodily in the water, by the admission or the removal of water ballast, is one that has much to recommend it. The convenience of carrying guns of the great power of 600-pounders, in revolving turrets, framed of 10-inch iron, protecting the gunners with something approaching absolute security, while at the same time a line of some 6½ ft. deep was alone presented as a target for the enemy, is extreme. So admirable a design for a battery may well be coveted for a sea-going ship. We cannot hold that the loss of a vessel of the kind, built without calculation and without supervision, should be deemed conclusive, as against the seaworthiness of every possible form of turret-ship. In the turrets, themselves structures of such enormous weight, and placed necessarily so much above the centre of gravity of the vessel, lies, no doubt, a great element of instability. It is possible that this element can only be mechanically compensated in a vessel of a larger size than any we have yet discovered the possibility of constructing for war purposes. But we deprecate the abandonment of the attempt to build a sea-going turret-vessel, as strongly as we deprecate the construction of turret-vessels which are not sea-going,—that is to say, with any purpose of sending them to sea.

The questions of tripod or jury-masts, and of the greater or less spread of sail borne by the *Captain*, important as they are, are of less moment than the question of the position of the centre of gravity. As to the fatal error committed on this score, the evidence does not leave the shadow of a doubt. Mr. Barnaby, the president of the council of construction of the controller's department of the Admiralty, furnishes some figures on this head. On the 26th of February, the Lords of the Admiralty ordered that "steps should be taken to ascertain the vertical height of the *Captain's* centre of gravity." It was, however, somewhat anomalously resolved that the trials of the steaming properties of the vessel should be made before this precise element of stability was ascertained. That this had not been previously attempted, however roughly, by calculation, is one of those facts for which we fail to find any excuse. It was not until the 29th of July that the *Captain* was actually inclined, by placing weights on her deck, in order to ascertain the position of her centre of gravity by calculations based on the experiment. The calculations were not complete, and the position of the centre of gravity was unknown to the constructors, until the 23rd of August,—the vessel having been allowed to proceed on her cruise, in the absence of this knowledge, on the 4th of August. From this trial it was ascertained that the centre of gravity of the dip was situated at a depth of 2·9 ft. (two feet and nine-tenths) below water. The distance between this point and the meta-centre, if Mr. Laird is correctly reported, is given at 2·6 ft.; but, as no information is given as to the amount of displacement, either when the vessel was vertical or at any angle of heel, we are not furnished with the means of applying the formula of stability of equilibrium to the case. Still, if the evidence be correctly reported, it would seem as if, but for the unexpectedly deeper draught of the vessel, the centre of gravity would have approached within 9 in. of the water-line, instead of being one-third below the line of flotation and two-thirds above the kelson. As the ship was actually built, it appears (assuming both calculation and report to be correct) that her maximum stability was attained at an angle of heel of 21°, when it was represented by 7,100 foot tons. From this very moderate inclination, which is more than three times that arrived at by actual experiment, the righting force diminished. The edge of the deck would have been immersed at an angle of 14°, when the righting force was stated to be 5,700 foot tons. How far the deck would have been immersed at the angle of maximum resistance is not stated. At 31½° the righting force had sunk again to 5,700 foot tons, and at 54½° it vanished altogether. The opinion appended to the statement of these facts that the reporter "did not think the *Captain* was unsafe," has been subjected to a grim and terrible rebuke. But even for these calculations, completed nineteen days after the *Captain* sailed, and just six months after they were ordered by the Admiralty, it seems that the only data obtained were those derived from placing 80 tons of ballast on the deck, causing an inclination of 6°. On this we are told that Captain Burgoyne said, "This ship is not difficult to get over 6°, but beyond that she will not go." The Assistant-Constructor replied that an additional 80 tons of ballast on the upper deck would cause her to go over to "about double that inclination." It would hardly seem as if the latter statement was much less of a shot in the dark than the former.

The subject is one which eminently concerns the profession of civil engineers. The high position which was held by some of the leading men of what we can hardly call the last generation is vacant. Men seem never to think of guiding themselves by such advice as was given by James Walker, by Robert Stephenson, by Isambard Kingdom Brunel. The collapse of the artificial system of contractor-built railways has involved a noble profession in a downfall, which, if in individual instances it may have been merited, is, nevertheless, a great loss to the public. In the whole of the proceedings as to the calculations and the construction of the *Captain;* the increase of the ironwork of her hull from 3,000 tons to 3,800 tons; the absence of correct theoretic calculations as to the flotation of the vessel; the actual and dangerous position of the meta-centre; the limping of experiment, calculation, and report, after the actual ocean path of the great battery; the declining of responsibility from Admiralty officers to contractors, and from contractors to My Lords; and, worse than all, in the final catastrophe, may be traced one clear and important lesson,—the *Captain* has been lost from the neglect to employ a competent consulting engineer.

Nor is the lesson less signal for the public and for the leaders of the public. Vehement advocates, in Parliament and in the press, for reasons the propriety of which must absolutely depend on scientific taste, may learn—if they can learn—a little modesty from the catastrophe of the *Captain*. Without admitting that the Admiralty have any excuse for failing to take proper advice, we may yet do well to remember, in the words of the Judgment rendered by the Court of Inquiry, that the construction of a vessel disapproved of by the permanent scientific officers of the navy was forced on the Board by popular clamour. At a time when it is becoming a prevalent doctrine, notably in some parts of the Continent, and increasingly even in England, that the less highly a class of men is endowed with the advantages of a liberal education, or, at least, the further it is below the position which can command these advantages, the more potential should be its voice in political questions, it is of extreme importance to observe what overwhelming calamity may, and we believe must, result from the application of the theory. From want of thorough knowledge, in more quarters than one, of the first requisite of a sea-going vessel, our finest floating battery has been sent to the bottom like a shot. We may not have paid, even in this sad and sorrowful event, too heavy a tax for our national safety, if we learn in time the danger of applying the same system, or rather the same no-system, to the erection of our public buildings, the direction of our army, and to the general defence of the country.

BUILDING IN A HURRY.

One of the most distinguished of the architects who aided in stimulating the Gothic revival in England, when asked, by a committee sitting on the plans of a proposed cathedral, for an estimate of the cost of the building, "for all reply" (as the French would phrase it), rolled up his drawings, and carried them off; and when

"With the morning cool reflection came,"

explained his behaviour by protesting that he could not deal with people who were silly enough to ask the "cost" of a cathedral, the building of which would, or ought to, extend over more than a life-time, and through all kinds of possible fluctuations in the labour market. This was, perhaps, carrying matters a little too far; and, moreover, it is not unlikely that the sentiment was based, not so much on a consideration of what modern builders could possibly accomplish, as on an illogical idea that since the building of a Mediæval cathedral generally extended over at least two or three generations, a modern one had no business to get itself built any quicker. More recent architects, Gothic and Classic, have at all events got out of this little superstition, or the public have worried them out of it. We are a business-like people, and whether the order is for a pair of soles under one's feet or a roof over one's head, the purchaser always wants to know "how soon he can have it." And it must be conceded that, in a business point of view, the demand is well met. Architects are ready to turn out plans for a town-hall or a monster hotel, by the aid of an efficient staff, in a wonderfully short space of time; and contractors, with an army of workmen and an imposing array of "plant," are prepared definitely to "name the glad day" when the work can be handed over complete and in good order, for the use and occupation of those who require it. In some respects, and in some cases, this rapidity and certainty in carrying out work, the result of modern improvements in communication, transit of materials, machinery, and in the organisation of labour, is an incalculable advantage. Where a building is wanted mainly for certain pressing practical needs,—where it is necessary, for instance, to build a hotel to meet the rapidly-increasing popularity of some special neighbourhood—in such cases it is almost essential to be able to state an early date when the work shall be in readiness, more especially when there are anxious shareholders who wish "to see something for their money." And in any case it would be absurd to ignore the necessary result in the building trade, as in other trades, of improved mechanism, material and social; or to suppose that because a great architectural style was developed under a slow and uncertain *régime* of building operations, the two facts were therefore to be regarded as in the relation of cause and consequence. But whilst all saving of labour is, in the main, so much to the common weal, there are, in regard to the practice of modern architecture, certain drawbacks attendant upon the greater facility with which large building operations are carried on, which it is as well not to lose sight of. Practical drawbacks there are, for instance, which, as they affect chiefly the comfort and health of the future inhabitants of a building, we may ask non-professional as well as professional readers to take into account. These nowhere show themselves more than in the erection of dwelling-houses, as frequently carried out, especially houses for the middle-class in point of wealth, who do not support more than one residence, and who, if they build a house, do it as one of the great events of their

lives, not to be approached or even entertained without due caution and deliberation. But, once decided on, the feeling is that of Macbeth, "if 'twere well done, 'twere well it were done quickly." In many cases, our client is a recently married or an about-to-marry man, bent on making a domestic homestead for himself and his descendants: and he must have the house ready by a certain date, because he is coming home from his travels at that time, or because of some interesting domestic prospects, or because he is constitutionally impatient; and so the house is planned in a hurry, and subsequent modifications have to be made for which no thought had been taken at first; and the bricks or stone are chosen in a hurry, and the former turn out to be friable and efflorescent, and the latter green and pervious to damp,—*n'importe*, the house must be ready, and so the joiners and plasterers are turned in upon the hardly-finished carcass, and the consequences are seen before long in "sweating" wall surfaces, and mottled ceilings, and decaying paint or paper. It is seldom that an ordinary middle-class dwelling-house is built as deliberately as it ought to be, in order to ensure good and permanent work. To do strict justice to a house, the shell should be built and left to stand for some months, till thoroughly air-dried, and till all the superfluous moisture has found its way out of the walls before its exit is obstructed by plaster and skirtings. But this would in general involve far too great a delay for an anxious and impatient client. Artistically, too, the house must suffer, since there is no adequate opportunity for considering the design of the fittings and furniture, which ought to correspond with the style of the building; but these are points so seldom actually considered by a house architect, and to which his client is in general so totally indifferent, that they may be practically left out of account in regard to English dwelling-houses. It is probable that were double the time and trouble expended over the actual building of the house, the owner would still fill it, as usual at present, with carpets and furniture bought from upholsterers' stocks, and of no style of design in the world.

In buildings on a larger scale than ordinary dwelling-houses, there is of course in hurried building the additional practical danger from insecure foundations and unequal settlement of work hurried up at an undue speed. In the matter of foundations, however, so much can be effected now with concrete, that where expense is no object, and time is, there may be less occasion for deliberating and experimenting on the nature of the site. But the most important prejudicial effect of hurried building, though one to which the public generally are quite indifferent, is seen in the architectural design. There are, unhappily, a large number of architects who are as careless in this matter as their clients, or who have no idea of it being necessary to study carefully the design of a large building; if they can turn out showy drawings in the prevailing fashion of the day, and set clever carvers to work upon the building, they have satisfied equally both themselves and their clients. And these are the class of architects who are most in favour with hotel companies and other speculators in large buildings; they are regarded as good men of business, and praised for their readiness and despatch. In the meantime those architects who wish to produce buildings that will be both durable and permanently satisfactory in effect are somewhat unfairly treated; the pace is set by the rapid and ready school of men, and the more careful and conscientious must either keep up to it, or be content to lose commissions which they can ill afford, either for their gain or reputation, to see go into other hands. So it comes to pass that a man who would be very glad, if he could, to give careful consideration to every detail of a building, finds himself with several large works on his hands, all required to be completed as soon as possible, and the result is a scramble in which details and all those subtleties of style and treatment which go to make up the charm of a really artistic building are left to chance and the clerk of works or draughtsman. There are very few large buildings to be seen which do not show in their treatment of detail evidences of disproportionate haste and consequent want of attention on the part of the architect, who is really not in general to blame in the matter, since he is hurried on by the demands of his clients. The architect of such buildings as the Law Courts and the Manchester Townhall (for example) ought to be so remunerated and so considered with regard to demands on his time that he could afford to give study to all the detail in its relation to the whole. Instead of this, too many buildings bearing the name of unquestionably talented architects bear also on their face the testimony that their ostensible author could have had but a very limited share in producing them, and that the details are just the current office stock of features (and we know how different offices run into mannerisms of their own), applied in a mechanical manner by a staff of draughtsmen, to the design which their chief has broadly sketched out, but had no time to work out in detail. No really satisfactory building ever was or will be produced in this manner; and we could point to several large buildings at this minute which convey to the spectator the idea that they are the conglomeration of the work of several designers thrown together at hap-hazard. Between the slow growth of a Mediæval cathedral and such a flinging together of materials as in Beckford's attempted tower at Fonthill, which was carried up day and night by the aid of torchlight and relays of workmen, and fell down the moment it was completed, there are many gradations of haste or deliberation; and there may be occasions when speed really is of the first consequence. But, in a general way, the public and the Government ought to understand that neither stable construction nor good architecture is to be had in a hurry; and that if they want really good work for their money, they must give their architect time to think and their building time to settle.

COLOUR IN STAINED GLASS.

One of the most remarkable movements ever recorded in Church history, but one that has scarcely received the notice which it deserves from modern writers, was that which was commenced by a few Benedictine monks in the east of France, at the close of the eleventh century. Disgusted with the laxity of manners which had overspread monastic institutions, and scandalised with the ostentatiousness and extravagance displayed in the buildings, decoration, ministration, and services of the Church, three monks of the Abbey of Molesme, desirous of following a stricter mode of life, and of adopting a simpler and purer form of worship, separated themselves from the community to which they belonged, and founded, in a desert place in Burgundy, a new convent and a new Order of Monks.

Such was the commencement of the great Cistercian Reformation, which, rapidly overspreading the whole of Christendom, in a wonderfully short space of time covered the face of Europe with its results, no less than 350 abbeys of this order having been founded, erected, and abundantly endowed within the first century of its existence. In no country did this reformation, and the simple earnestness of its promoters, meet with greater favour and readier acceptance than in England. Landowners and nobles vied with one another in offering sites for their convents, in aiding them to raise their Abbey church and their domestic buildings, and in amply endowing them when completed: witness the numerous noble remains of this Order in Great Britain, which still survive the disastrous effects of a subsequent Reformation, due to similar causes, the destructive ruthlessness of which swept away much that was noble and admirable, as well as much that was corrupt and degenerate.*

Again and again has the same thing happened. We see it in the outbreak of the Iconoclasts, in the early ages of the Church, and in their wholesale destruction of images and pictures; as well as in the subsequent separation of the Greek and Latin Churches due to the same causes. We have it again in the protests and secession of the Cistercians in the eleventh century, and in the action of Wycliffe and his followers in the fourteenth. We see it later still in the German Reformation of the fifteenth century; in the suppression and destruction of monasteries under Henry VIII., and in the puritanical havoc of the great Rebellion.

In this frequent recurrence of the same causes and the same effects, from time to time, in the history of the Church, we recognise, in the first, the natural proneness of human nature to that which captivates the eye and pleases the senses, and the constantly increasing tendency to ornate services, to church decoration, to a sensuous ritual, to pictures and images, and ultimately to superstitious observances, and saint-worship; and we see, in the second, the sure result of that revulsion of feeling which suddenly arises when the lowest point in this downward progress of mental subserviency is arrived at.

Of these different movements in the latter direction, not one was commenced and carried out with so much humility and gentleness of spirit as that of the Cistercians. Content to protest and to dissent, they proved the sincerity of their professions by the sanctity of their lives, and by the reality of their self-denial, rather than by aggressive attacks on the system which they condemned. In no document, however, either of ancient or modern times, is the use of colour and gilding on walls and windows, of gold and silver in ornaments and utensils, of pictures and images, of superstitious practices, and saint-worship, so emphatically denounced as it is in the Charta Caritatis of the Cistercians, the code of laws which, adopted in the earliest days of the foundation of the Order, and subsequently enlarged and confirmed under the auspices of St. Bernard himself, remained the rule of life of all the monasteries of the Order.

The manly independence which characterises this early protest or charter is sufficiently remarkable, when we consider the circumstances and the times in which its authors lived. Without throwing off their allegiance to the Church, they acknowledged no authority in the administration of their affairs, or the government of their own monasteries, but that of the head of their Order. They forbad, indeed, their members to go to Rome, unless accompanied by a bishop of the Cistercian Order.[a] They prohibited prostration in their churches, and any abject position of the body whilst praying.[b] They abolished saint-worship, and permitted their churches to be dedicated only to the Blessed Virgin.[c] They tolerated no images, or pictures even, of saints; nor, indeed, the representation of the human form on their walls, or in their windows; nor even the crucifix itself; permitting only a painted wooden cross.[d] This order is further supplemented, and their opposition to all approach to sensuousness, either in their service or ritual, is further illustrated by a comprehensive order passed at the General Chapter of 1213;[e] and again by two remarkable injunctions relating to bell-ringing and singing, occurring, the first, in the same general order of 1213, and the second in the second edition of the Charta Caritatis of 1134.[f] Their objections to polychrome, and to richness of ornamentation of every description, arising evidently from the extent to which the abuse of this species of decoration on the walls, and in the vestments and utensils of the Church, had been carried, are emphatically conveyed in their various prohibitions on this head, which descend even to the clasps of their books and the lettering of their manuscripts.[g] Lastly, we have the following remarkable order in regard to stained glass:—Cap. lxxxii. "Vitreæ albæ fiant, et sine crucibus, et picturis." Strong colour is to the eye what strong drink is to the palate; and we gather from the strength of the remedy in this case what must have been the extent of the disease at the time when these rules were drawn up. Nothing short of *total abstinence* having been considered by the Cistercians of that day, as by the Temperance Societies of our own time, to be likely to be effectual.

That these rules, and others, which regard

* Amongst English Cistercian abbeys of the first class are to be reckoned the following:—Fountains, Furness, Kirkstall, Byland, Rievaulx, Jervaulx, Tintern, Netley, Beaulieu, Buildwas, Kirkstead, and Croxden.

[a] Cap. lxxvi. "Nemo nostri Ordinis Romam eat, nisi cum Episcopo sui Ordinis."

[b] Cap. lxxxvi. "Non est nostræ consuetudinis monachum, vel conversum prostratum . . . . corpore jacere in oratione, sed super genua, vel stando."

[c] Cap. xxi. "Decernimus ut omnes Ecclesiæ nostræ, ac successorum nostrorum in memoriâ terræ Reginæ, sanctæ Mariæ fundentur, ac dedicentur."

[d] Cap. xix. "Sculpturæ, vel picturæ in ecclesiis nostris, seu in officinis aliquibus Monasterii, ne fiant, interdicimus. Cruces tamen pictas, quæ sunt ligneæ, habemus."

[e] "Superfluitates, et curiositates notabiles in sculpturis, ædificiis, pavimentis, et aliis similibus quæ deformant antiquam Ordinis honestatem, in Abbatiis, grangiis, vel cellariis nostris ne fiant interdicimus."

[f] Cap. xii. "Campanæ Ordinis nostri ita fiant ut unus tantùm pulset eas, et nunquam duo simul."

Cap. lxxv. "Viros decet virili voce cantare, et non more fœmineo, tinnulis, vel, ut vulgo dicitur, *falsis vocibus*" (*i.e.* falsetto).

[g] Cap. x. "Omnia Monasterii ornamenta, vasa, utensilia sine auro, et argento, et gemmis, præter calicem et fistulam, quæ quidem duo sola argentea, et deaurata, sed aurea nequaquam, habere permittimus."

Cap. xiii. "Interdicimus ne Ecclesiarum nostrarum libris aureæ, vel argenteæ, sive deargentata vel deaurata habeantur retinacula, quæ usu *firmacula* vocantur."

Cap. lxxxii. "Litteræ unius coloris fiant, et non depictæ."

exclusively the architecture of their buildings, and which, as not applying to the matters in question, I have not here referred to, were strictly observed during the first two hundred years of the existence of the order, there is little doubt. And although, in consequence of the almost total disappearance of the Order, and the alienation or state of ruin in which the whole of their buildings exist at the present time, there remain little or no traces of their decoration or furniture, yet I can vouch for the fact,—having visited the remains of all the chief abbeys of this order in France, England, and Germany,—that the instructions of the Charta Caritatis in regard to their architecture were strictly observed during these two first centuries; and we may therefore conclude that, in the matter which interests us,—namely, their wall decorations and their windows,—there was the same uniformity of observance.

Singularly enough, however, the most beautiful stained glass that I ever beheld, I saw in the ruined abbey-church of a Cistercian monastery, in 1832. It was designed, in all probability, just at the time when the severity of the rules of the Order in this respect, as also in others, began to be relaxed. The abbey of which this church formed a part was founded in the year 1133, at Altenberg, near Cologne, by Eberhard, Count of Berg, whose descendants rebuilt the abbey-church, from the designs and under the superintendence, it is said, of Erwin von Steinbach, the architect of Cologne Cathedral, in the latter part of the thirteenth century. At the dissolution of the monasteries, the abbey was converted into a manufactory, and suffered from a fire in 1815, which destroyed the conventual buildings and injured the church; but when I visited it, in 1832, the church, though roofless and in ruins, still retained the whole of its magnificent Geometrical windows, filled with the most elegant stained glass. The Prussian Government has, I believe, since restored the roof and repaired the church, and, it is to be hoped, has thereby saved the glass. The design of the building, which, from its windows and moulded detail, belongs, evidently, to the period ascribed to it, bears in every part the impress of its Cistercian origin,—simplicity and elegance of design being its chief characteristics. It is lofty and of noble and stately proportions, but entirely devoid of all florid ornamentation; what carved work there is is chiefly in the pier-capitals, having much gracefulness in its composition.

It is, however, to the stained glass of its noble windows that I desire to call the attention of those who are interested in the subject we are considering. It is scarcely necessary to say that they contain no "pictures," and no patches of gaudy colour. They consist, in fact, exclusively of designs of foliage, arabesques, and diaper-work of the greatest elegance, and of infinite variety, arranged chiefly in geometrical patterns, executed in grisaille, and other light colours; and belong in all probability to the latter part of the Period in which the church was built,—that is to say, to the latter part of the thirteenth and the commencement of the fourteenth century; in other words, to the very best Period of Christian Art.

Of the artistic nature of these designs, and of the admirable manner and material in which they are executed, it is impossible to speak too highly. Of even feminine fairness and gracefulness, they surpass, in my opinion, all the examples of this kind that we have in this country, not excepting the Five Sisters of York; and if, in the matter of stained glass, it were desired to select works of art that would most fitly typify and represent the purity and simplicity of Anglican worship, I should not hesitate to indicate the windows of Altenberg Abbey Church as the models we should adopt. In such a case as that of Salisbury Cathedral, for example, where nearly all the windows are of common white glass, if the Dean and Chapter, instead of permitting them to be filled one by one, at rare intervals, by "private munificence," at a great cost, with deeply-stained glass of the kind usually supplied by glass-stainers at the present time, were to adopt some general plan by which the whole of, or at least the lower windows of, the cathedral might be filled, in the course of a few years, by public subscription, with stained glass of really artistic and graceful design, and of the character of the windows of Altenberg Abbey Church, enriched with smaller portions of deeper colour, introduced sparingly and in the gem-like manner already alluded to, an admirable work might be accomplished, at one-third of the cost and in one-fifth of the time that would be otherwise required, which would mark the commencement of a new era in the art of glass-staining in this country. For it is hardly to be doubted that an example thus set, by which it could be shown that works of real art, more in harmony with the character and spirit of English worship, could be produced at a cost which would bring them within the reach of all church-restorers and church-builders, would be rapidly followed, in this progressive age, by the almost universal adoption of a mode or fashion, which, offering a happy medium between the painful glare of common glass, and the gaudy sensuousness of a typical memorial window of the present day, would be assuredly recognised in the latter part of the nineteenth century as a considerable improvement on that which prevailed during the earlier part of the same century.

I need scarcely say, in conclusion, that were such a fashion to become prevalent, the argument in favour of extravagantly-coloured wall-decoration, based upon the present use of deeply-stained glass in our windows, would naturally fall to the ground. EDMUND SHARPE.

THE NEW INFIRMARY BUILDINGS FOR EDINBURGH.

THE plans for the new infirmary on the grounds of Watson's Hospital, at Edinburgh, are now in the hands of the managers. The foundation-stone of the buildings is to be laid with full Masonic ceremony by the Prince of Wales.

The general scheme adopted by Mr. Bryce is that of the Pavilion system. In the site he found the advantage of a southern exposure, together with a sloping surface, which admitted of buildings being so placed that those to the southward should not prevent the genial breezes from playing on those further north. Mr. Bryce has arranged his wards so that their windows shall look east and west, so as each day to get the morning sun on one side, and the afternoon sun on the other.

The main front of the infirmary is turned towards the important thoroughfare of Lauriston; and here, as a matter of course, the architect has introduced his most important façade. The style adopted is an adaptation of the old Scottish, the frontage in some of its features bearing a marked resemblance to that of Holyrood Palace. In the centre is an elevation fully 100 ft. long and three stories high, in addition to a half-sunk basement. The main feature in this block is the great tower, which projects slightly from the general line, and has its base pierced by the main entrance. The arched doorway is flanked by a window on each side, as also by a series of pilasters supporting an ornamental cornice. Over the cornice is a three-light window, surmounted by a triangular pediment, apparently intended to be filled in with sculpture. The next stage of the tower is occupied with two plain windows, and a panel for an inscription or sculptured design. Above this point the tower rises clear of the wall-head—a massive square structure, with round corbelled turrets at the corners. The upper stage of its front wall is pierced by a three-light window, with arched heads. Towards the top the tower walls are corbelled outwards, and finished off with a cornice, above which rises an octagonal spire, carrying a vane and weather-cock. On the wall-head in front is a panel for a clock-dial. At the east and west sides are ornamental chimney-stalks, which combine with the spire and pinnacled roofs of the turrets to form a group. The elevations on the east and west sides of the tower balance each other. The ground-floor windows are plain; those of the first floor are surmounted with projecting pediments; and those of the top story terminate above in gablets, which rise above the wall-head and diversify its outline. On a level with the upper windows a corbelled turret springs out at each end of the elevation. The roof is high-pitched, relieved with a row of small dormer windows, and finished above with an ornamental crest-rail. The central block presents towards the east and west a sky-line of stepped gables.

From the central building, which may be generally described as designed for administrative purposes, there runs out at each end a low range, showing to the front large four-light windows, and finished above with a stone balustrade and flat roof. These are corridors giving access to the pavilions, which go to complete the north frontage, and contain the wards of the surgical hospital. Of these pavilions there are four on the north side, which, being placed end-on to the corridors, run out at right angles to the extent of 110 ft. beyond the line of the central block, and present their outer ends as prominent features in the general façade. The two inner ranges, distant each about 28 ft. from the central building, form with its front three sides of a spacious square, which will be gravelled over, and will form the carriage approach to the main entrance. As seen from the front, the pavilions present two distinct elevations, one on each side of the central block. There is a stepped gable, flanked by two round towers, like those of Holyrood; then an open screen, consisting of a low balustrade and range of stone columns about 10 ft. high; then other two round towers, with stepped gables between. Next is the central elevation already described, and on the other side a series of round towers and stepped gables, with open screen as before. In the centre of the screen, on each side, a short flight of steps leads down to an airing-ground, being the space inclosed between two pavilions and the corridor at the back, by which they are connected. These spaces measure about 80 ft. in width, that being the distance maintained between the pavilions. At the south end of each is a low building, 30 ft. by 30 ft., projected forward from the corridor, and intended to be used as a class-room. The pavilions are two stories in height, besides half-sunk basements. In their north ends they present three-light windows with stone mullions. The side elevations are plainer in design, but relieved here and there with stepped gables, turrets, and chimney-stalks.

The main-front architectural features are reproduced in a less ornate form, and under various modifications, all through the design. The central block is occupied with a spacious entrance-hall and staircases, manager's room, stewards' accommodation, and a variety of other offices. On each side branch off the corridors, 12 ft. in width, which give access on the right to the female, and on the left to the male wards. Each pavilion, or block of wards, seems to be as nearly as possible an exact duplicate of every other. The ward, with a height of 15 ft. 6 in., occupies the entire width of the pavilion, 28 ft., and its entire length as well, with the exception of a portion next the corridor, which is appropriated for a kitchen, convalescent-ward, private ward, doctors' room, nurses' room, and bath-room. At the opposite end, the interior of the round towers gives space for other necessary offices. Each ward is thus complete in itself, and may be isolated from the rest of the hospital, without interfering with the efficient treatment of its inmates. The ward proper has a range of windows and a fireplace on each side. The beds are placed between the windows, at distances of 9 ft. from one another. In the four pavilions which run northward from the corridors, and two others, not formerly mentioned, which run south, there are in all 16 wards (not to speak of private wards), containing 260 beds; besides 3 reserved wards, with 48 beds, to be used when the ordinary wards require to be vacated, for cleansing or other purposes.

From the rear of the surgical-house a low range, in which space is found for a commodious operating-theatre, besides corridors and stairs, leads to the present Watson's Hospital-buildings, which are to be retained and turned to account as residences for officers and accommodation for various administrative departments. Access to the latter part of the establishment is provided in the shape of piazzas, with open galleries overhead. A portion of the intervening ground, measuring 140 ft. by 80 ft., is proposed to be laid out as a garden, and to be used, in connexion with the piazzas, for the recreation of patients. In its general arrangement, the medical hospital repeats the features of the surgical department.

The medical hospital contains fifteen wards (besides private wards), with 340 beds, and is also provided with four reserved wards, making up 100 beds, to be used in cases of emergency. It thus appears that, exclusive of reserved wards, the two hospitals contain between them accommodation for 600 patients.

In addition to this, there is the fever-house—a separate building, placed at some distance to the south-west of the surgical hospital. This block has round towers at both ends. The fever-house is designed to make up about 40 beds. Between the fever-hospital and Lauriston is the pathological house, containing a lecture-theatre of ample dimensions, and a chemistry-room. The mortuary, washing-house, laundry, work-

shops, &c., are situate still farther to the west, at a distance from the public thoroughfare.

At each end of the north or Lauriston front a gate and hedge will be placed. The spare ground to the south of the medical hospital, sloping down towards the Meadows, is proposed to be laid out as pleasure-grounds.

THE APPROACHING INTERNATIONAL EXHIBITION.

Fans.

It seems necessary to repeat that the special object of the Exhibition is to exhibit selected specimens, and not everything that a manufacturer can produce; and it will thus be distinguished from previous Exhibitions, in which allotments of space were made to manufacturers and others, who filled them as they thought fit. All objects must also be submitted for the inspection and approval of committees of selection. The exhibitions will be distributed into four divisions, three of which,—fine arts, scientific invention, and horticulture,—will recur each year. In the other division different classes of manufactures will be included in turn each year, till every branch of industry has been represented. In the fine art and scientific invention divisions, no object will be entitled to admission unless it be distinguished by some special quality, such as novelty, excellence, or cheapness.

In the several classes of manufacture the goods will be distributed into a sufficient number of sub-divisions to bring the different branches of each class together, so that similar productions from different countries and localities will be placed in immediate juxtaposition, in order to facilitate examination and comparison.

We are asked to mention that artists, manufacturers, and others who have not expressed their desire to be admitted as exhibitors in 1871, are requested to do so before the 10th of November next.

The *Fan Competition* is exciting some interest. Her Majesty the Queen offers a prize of 40*l.* (1,000 francs) for the best fan exhibited in the International Exhibition of 1871, being either a work of painting or carving, or a combination of both, and executed by a female artist or artists under twenty-five years of age, subject to the conditions mentioned below. Mrs. Herbert Taylor offers a prize of 25*l.* for the second best fan. The Lady Cornelia Guest and the Baroness Meyer de Rothschild offer separately a prize of 10*l.* for each of the two fans next in the order of merit. All these are to be awarded subject to the same conditions as those decided on by her Majesty for the first prize. The conditions of competition are obtainable. The awards will be made by an international jury selected by the commissioners of the competing countries. The commissioners, as already notified, do not intend to award prizes to exhibitors. They will, however, afford every facility to societies and individuals desirous of offering prizes for the encouragement of art or industry in connexion with the annual international exhibitions; and are prepared to receive such offers, and to publish the conditions of competition which the donors may wish to prescribe.

In connexion with the Fan competition, we may mention that the September part of the *Journal of the British Archæological Association* contains a very interesting article on "Fans,—their Antiquity and Uses," by Mr. Henry F. Holt. The writer refers to the use made of the fan in the eighteenth century in recording the event of the day. Literature, music, politics, and fashion were alike made subservient to its power, and to an extent which can now be hardly imagined. In like manner church or opera, senate or theatre, became the medium of its exhibition. Thus, when Dean Swift's "Gulliver's Travels" appeared, all the principal events were depicted on both sides of the fan. The same result followed the production of the "Beggars' Opera," the favourite songs in which were painted on the fans, and political emblems were so rife that a lady's opinion was as readily known by her fan as by her patches. A similar practice prevailed in France, and in the time of the Revolution their artists were fond of recording the principal events of the period upon fans, among which may be mentioned "The Mountain Child of the Republican Constitution," "The Triumph of National Religion over Atheism, Fanaticism, and Scepticism," "The Fête of Agriculture," &c. Occasionally (although very rarely) "fans" were adapted in their ornamentation to the useful. At the close of the eighteenth century a fan was advertised in the *World* especially adapted to the frequenters of the opera, and was thus described:—"These fans present at one view the number of boxes, including the additional ones; the names of subscribers, &c., and have been carefully compared with the plan of the house, as kept at the office."

In the eighteenth century fan-making was an extensive and important business, and called into requisition the talents of the highest and best painters, many of whom commenced life as fan-painters. In England at this period an Italian artist, named "Pozzi," painted fans from designs supplied by West, Reynolds, and Capriani, and which, according to Miss Burney, were painted on leather, thereby meaning "chicken's skin," which she described as being "more beautiful than could well be imagined." In like manner, France produced in the eighteenth century many artistic celebrities with whose names "fans" are intimately associated. Amongst them may be mentioned Watteau, Godefroy, Frangenard, Boucher, Lelu, and Wille fils. Occasionally, says Mr. Holt, the fan was made to perform the office of "prompter," as occurred on the occasion of the market-women of Paris, offering a congratulatory address to Marie Antoinette on the birth of the Dauphin, when the spokeswoman had the address (written expressly for the occasion by M. de la Harpe) set down on the inside of her fan, and to which she repeatedly referred without the least embarrassment.

ON THE UNION BETWEEN SCIENCE AND LABOUR.

Dr. Lyon Playfair, president for the year of the Birmingham and Midland Institute, delivered an address at the opening of the session, "On the Intimate Union between Science and Labour." This union, he said, is far from being simple. It is not science which creates labour, or the industries flowing from it. On the contrary, science is the progeny of the industrial arts on the one side, and on the other of the experiences and perceptions which gradually attach themselves to these arts. So that the evolution of science from the arts is the first circumstance of human progress, which, however, quickly receives development and impulse from the science thus evolved. Industrial labour, then, is one of the parents, and science is the child; but, as often happens in the world, the son becomes richer than the father, and raises his position. It may not be the waste of an hour if we consider these relations more closely.

The new president then proceeded, in a very able address, to work out his theme with many illustrations. We can only give a specimen of his method:—I see opposite my study-window as I write a house in course of erection, and the labour of the builder will serve my purpose as well as any other. An Irish hodman is carrying a number of bricks up a ladder, in order to supply material to the builder. The sight is familiar to us still, though not so much so as it was a few years since, because a change is passing over this form of labour. Let us study the reasons for the change. The Irish hodman is a human machine, unskilfully and expensively put into operation. He felt that himself, in his fine, confused way, when he wrote to his friend in Ireland, 'Dear Pat, come over here and earn your money; there is nothing for you to do but to carry the bricks up a ladder, for there is a man at the top who takes them from you and does all the work!' The man at the top is a skilled workman, more nearly fulfilling his human functions, for he is using intellect in his work. The hodman is a worker also, but only a user of his own brute force in a very unintelligent way. Every time that he ascends the ladder with his load of bricks, he is carrying up his own weight in addition to that of the bricks; his force is thus wastefully expended. After many years his employer perceives this, and substitutes human labour first by that of a horse, then by that of a steam-engine. Now, when you pass a house in course of erection, you will see a horse trotting over a prescribed course. It is pulling up a whole barrowful of bricks by a rope and a pulley. The horse, tended by one man, is doing the work of seven or eight hodmen, and with much economy of money, inasmuch as the cost of the hay and oats, from which its power is derived, scarcely exceeds that of the beef, potatoes, and beer of a single hodman; while increased economy of labour is also attained, because the weight represented by the bodies of seven hodmen is not drawn up along with the bricks. Food, burned within the bodies of the men and the horse, is in both cases the source of power. Again, in large houses the horse disappears, and a small steam-engine draws up the bricks. Economy is again achieved; for the coal, which is the food of the engine, is less costly than the hay and oats required for evolution of force in the horse. A single man, using scientific knowledge in the guidance of the engine, is now doing the work of several horses or many men. Let us analyse the changes which pass over the forms of labour illustrated in this particular case. The first tendency is to substitute the brute force of a man by an intellectual superintendence of a cheaper form of force, either animal or physical, the aim being to obtain economy of production, either through economy of time, or by the substitution of a cheaper form of force for human labour. In fact, economy of time generally follows the economical substitution of force. Savages have an utter disregard of time in the performance of labour. They will expend a month in sharpening a single arrow. Some of the rock crystal cylinders worn by chiefs for ornaments are stated to take two men's lives to perforate. The Kamtschatdals of North-Eastern Asia take three years to hollow out a canoe, and one year to scoop out the trough in which they cook food. As soon as a savage tribe employs fire, instead of implements made of stone or bone, to hollow out their canoes, they are using a natural power to economise time and brute human force, and are on the high road to civilisation. In human progress it is always so, for it is a natural law that the sweat of the brow should be lessened by the conception of the brain. The economy produced by the substitution of cheaper for dearer forms of force is remarkable in all cases where it is applied. The Prussians saw this very well when they wanted to make England declare coal as contraband of war in the present campaign, that it was representative of so many men added to the enemy; for three or four pounds of coal, even in the wasteful way in which it is used, are more than equal to a man's force.

SCHOOLS OF ART AND OF SCIENCE.

The Dorchester School of Art.—The annual meeting and distribution of prizes in connexion with this institution, which was established about two years ago, have taken place at the Town-hall. Prior to the commencement of the proceedings, the friends of the school inspected the specimens of work executed by the pupils. Above the platform were ranged a number of drawings in chalk and water-colours, while around the hall were numerous specimens of freehand and modelling. The chair was taken by Mr. John Floyer, M.P. The Rev. B. L. Watson, as hon. secretary of the school, presented the annual report, which spoke of the continued prosperity of the school. During the year 1869 it was attended by 88 students, of whom 74 remained on the books at Christmas. At the Government examination on the 10th and 11th of March, in this year, 17 students presented themselves for examination in freehand, of whom 8 passed; in geometry, 8, and 5 passed; in model drawing, 17, and 10 passed; and in perspective, 6, and 2 passed. In freehand, 3 passed "excellently," gaining prizes; in geometry, 3; and in model drawing, 5. Eleven prizes were consequently awarded to nine students for excellence in examination. In April, 253 works, by 52 students, were sent up to South Kensington for examination. Of these 3, Miss Emson, Miss Maskew, and Mr. Edward R. Pearce, were deemed worthy of being admitted to the national competition, and five third-grade prizes were awarded. Payments were made on account of works executed by seven artizan students. The Science and Art Department having offered prizes for the best designs for fans, three of the students competed; and, though no prize was gained, the design by Miss Coombs was purchased for its excellence by the Department. Income of school for 1869, 195*l.* 6*s.* 5*d.*; expenditure, 176*l.* 6*s.* 1*d.* The magistrates of the county continue the gratuitous use of the Shire-hall. The necessity, however, of securing as soon as possible a more permanent home is not to be lost sight of. The committee desire to recognise the efficient services of Mr. Campbell, the master.

The Liverpool School of Science.—The tenth session of this school was opened in the small concert-room at St. George's Hall, and Professor Huxley, LL.D., F.R.S., distributed the prizes which had been gained by the students during the past session. Professor Huxley said he understood that the school was established in 1861. In 1865-6 the number of students amounted to not more than twenty-eight, and out of that number not more than thirteen presented themselves for examination, of whom only seven passed. But that might be considered their lowest point—their point of difficulty. He heard, and one could not be surprised at it, that with those results there was some talk of giving up the great enterprise in which those who started the institution had embarked; but, happily, wiser and more tenacious counsels prevailed, and now they saw a very considerable improvement in the affairs of the school. He was informed that now they had 151 students, and out of that number forty-one had presented themselves for examination; and although he did not know the exact number of those who had passed, it was certain that the number must be considerable, for no fewer than sixty-three names were passed in the different groups of examination either in the first or second class. Therefore the progress of the last five years must be considered eminently satisfactory; but, looked at from the point of view of any one who thought what ought to be the history of an institution of the kind in Liverpool, he could not quite so heartily congratulate them. He was informed that this school of science had not even at the present time any precise local habitation; that it had no laboratory, no place in which experiments could be performed, and in which practical teaching could take place. He was told, that in the way of positive endowments they were enriched to the singular extent of 17*l.* 13*s.* 6*d.*; and he had learnt that their income from other sources, leaving aside for the moment the school fees, which were turned to the purpose of giving the very modest reward which was given for the labours of the teachers, did not amount to 100*l.* In conclusion the professor urged the people of Liverpool not to slacken that grand public spirit which had done so much in diminishing the physical evils of their great town; to remove those obstacles which clog the path of mute Miltons and silent Hampdens; to give them a helping hand, and to aid them, as far as possible, to grasp that helping hand. The Earl of Derby said, for nearly the whole of the nine years that the Liverpool School of Science had been in existence he had been one of the vice-presidents, yet he had only been present at one distribution of prizes; but it was never too late to mend, and he should be happy to place 200*l.* in the hands of the treasurer, the proceeds to be laid out in a yearly prize, or in prizes, to be adjudged as the committee pleased.

The Brighton and Sussex School of Art.—The eleventh annual meeting of this school has been held at the Town-hall, Brighton. The mayor presided, and opened the proceedings with a brief address. Mr. F. Merrifield next read the annual report, and the certificates and prizes, which the mayor distributed. The meeting, which was select, though not large, was addressed by the borough members. Mr. J. White, M.P., alluded specially to some of the ways in which the rules of true art are violated; Professor Fawcett, M.P., regarded art more in its political relations. The Rev. Dr. Griffith urged ably the necessity of specific schools for different technical subjects. Mr. F. Merrifield described the working of the Brighton School of Art; and Mr. C. Lamb, in a characteristic speech, castigated the townspeople for not contributing more liberally towards the school, and set a good example by promising a contribution. The report stated that during the year 1869, 527 persons had received instruction at schools under the direction of the master, Mr. White, of which number 430 had been taught at national and other similar public schools, 25 at the day classes of the School of Art, and 57 at the evening classes for artizans, schoolmasters, &c. There were also 15 female students. A good many trades were represented in the School of Art. The second annual examination took place in March last, when, in freehand drawing, 10 were excellent, and 48 passed, against 8 and 43 respectively in the previous year; in geometry, the numbers were 10 and 8, against 3 and 6; in perspective, 2 and 5, against 1 and 3; in model drawing, 4 and 18, against 1 and 8; in mechanical drawing, none went up in 1869, one did so in 1868 and passed. The total number of prizes received from last year's work was 20, against 11 the previous year, and 4 certificates against 1 on the former occasion; there had therefore been a total increase of 50 per cent. With a larger subscription list the committee could greatly develope the utility of the school, as well as allow the head-master a better remuneration than the inadequate one he now receives.

The Government Commission on Applied Science. At the recent meeting of the British Association, Professor Williamson, F.R.S., made a communication respecting the resolution of the Committee of Section B, on the proposed establishment of a new school of applied science by Government. He said that the Commission appointed by the Government to make inquiries respecting scientific education had now been for some time prosecuting its inquiries, but it was credibly reported that they intend to take a course of action in this matter precisely of the kind objected to—establishing a special college for the purpose of training engineers for the Indian Department of the Government service. He said that there were at present universities in Great Britain which did this, and that if the Government carried out their intention they would not be in a position to deal impartially with the general question undertaken by the Commission. Besides, if it could be shown that such a college would be advantageous, let it be established after the whole subject had been dealt with. The section the previous day had passed a resolution in accordance with this opinion. The president considered that the committee of the section were quite justified in the resolution which they had adopted. After the Government had undertaken to make the inquiry, they had no right to establish such an institution until the Commission has reported.

SANATORIUM FOR DURHAM SCHOOL.

The Dean and Chapter of Durham, who have always shown a great interest in the well-being of their cathedral school, have recently erected a convenient sanatorium for its use, in place of the small sick-rooms connected with the master's houses.

The new building, which is separated by the playground from the school, occupies a most delightful situation on rising ground, having a southern aspect, and commanding beautiful views of the cathedral and the wooded banks of the river, with an extensive panorama beyond.

It is mainly constructed of brick, faced with Jowlan blockers and Dunhown dressings, is designed in an early type of Gothic in harmony with the adjoining school, and consists of a large central hall with four large rooms or wards for boys, rooms for parents or friends, but which can also be used for boys if required, matron's and servants' rooms, bath-room, kitchen, and offices, disinfecting and work room. The main building is two stories in height, with cellars under the whole of the east side, and the hall extends from front to back on both floors. The whole of the upper floors are constructed with Dennett's fire-proof flooring, and all rooms are ventilated by Doulton's air-flues. The cost of the work (exclusive of the site and furniture, which have also been given by the Chapter), is upwards of 2,300*l.*; and the whole has been carried out from the designs and under the superintendence of the cathedral architect, Mr. C. Hodgson Fowler, by the undermentioned tradesmen:—mason, Mr. J. Taylor; joiner, Mr. George Gradin; slater, Mr. R. Rule; smith, Mr. J. Chisman; plumber, Mr. Laidler; and painter and glazier, Mr. W. Hodgson.

THE NEW SEWERAGE SCHEME FOR DUBLIN.

It has at last been finally agreed upon that the Dublin Corporation shall accept 350,000*l.* at five per cent.,—four per cent. to represent the interest, with one per cent. as a sinking-fund, to exhaust the principal in a number of years. This sum will be advanced by the Government on security of the rates.

The plan of a parallel sewerage (confined to the city) each side of the river, which we suggested in these pages, is that adopted in the new scheme, but its efficiency depends much on the completeness of the outfall. Carrying the sewage to a point below the tideway, and emptying it into the sea in an untouched and unutilised state, would be a mad and mischievous act.

The stench in the Liffey, for three miles of its length, from King's Bridge to the North Wall Lighthouse, will certainly in a manner be abated, as the small sewers will be intercepted from passing into the river. This, so far, will be a great relief. We, however, can hardly credit as a fact that the whole of the valuable sewage of such an important city as Dublin will be wastefully cast into the sea, at a point where the greater portion of it is certain to be carried back again into the river-bed, to entail more laborious dredging operations than are at present needed to render the harbour navigable.

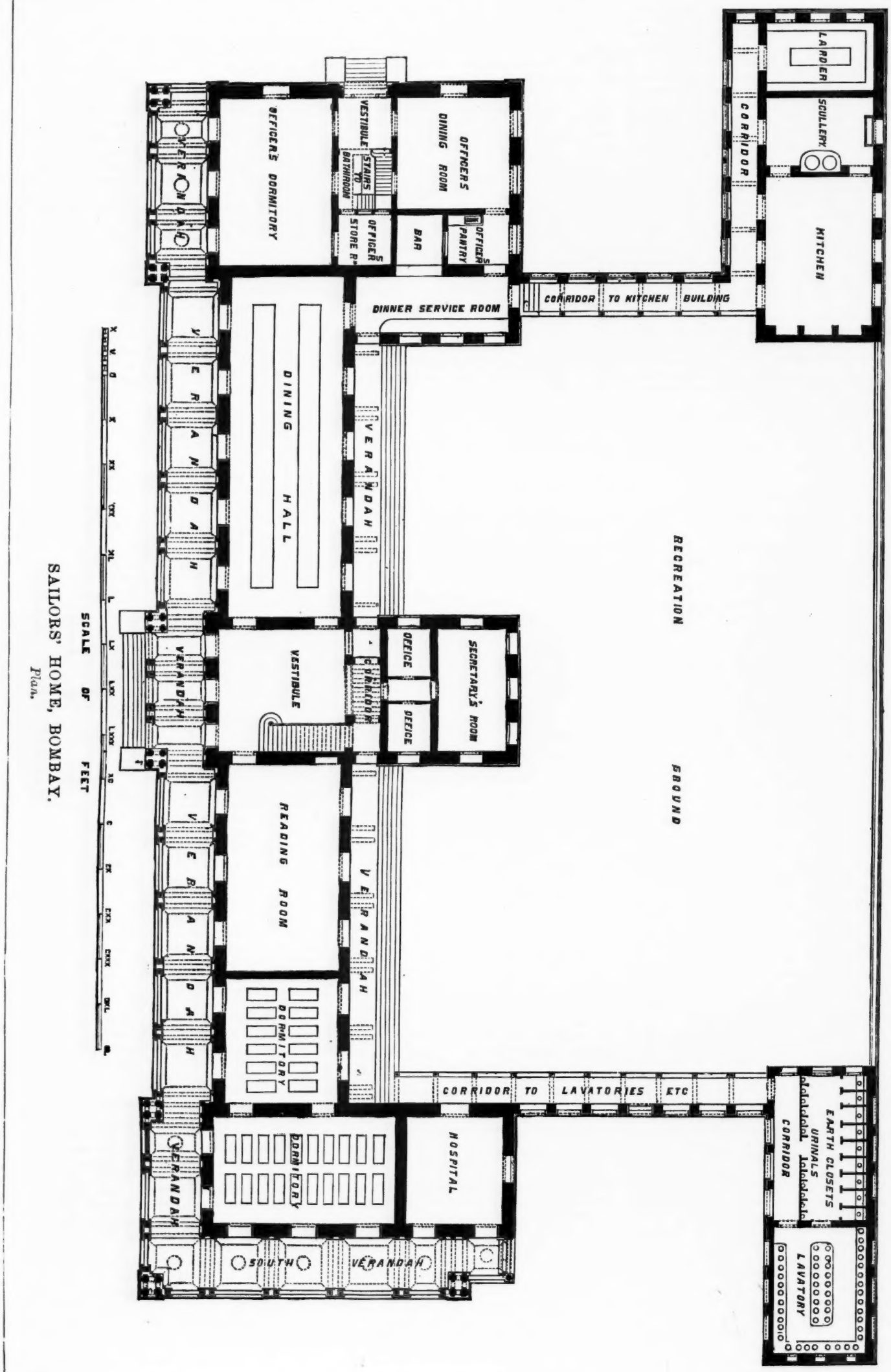
What about the unreclaimed strands of Irishtown and Clontarf. Can no scheme be adopted whereby some hundreds of acres of useless sandbanks, less than three miles from the city and in sight of the harbour, can be rendered profitable. The sewage of Dublin could be well utilised in this direction. We would caution the corporation not to throw away a convertible material that will help them to pay off their mortgages and lighten the city rates. A tidal river is the windpipe of a city; if this tidal windpipe is a short and narrow one, like the Liffey (and unlike the Thames and Clyde), its mouth is very likely to be blocked up beyond the measure of its own natural relief or swallow. The open sea, properly speaking, does not commence until the bar is crossed at Poobeg Lighthouse. Inside this a sort of inner bay or harbour exists. If the sewage is dispersed at any point within these limits, then we unhesitatingly say that the new sewerage scheme of Dublin will prove a delusion.

SAILORS' HOME, BOMBAY.

On the occasion of the recent visit of the Duke of Edinburgh to Bombay, it was determined to commemorate the event by the erection of some permanent work of public utility; and the happy idea was suggested that nothing would so appropriately celebrate the visit of the Sailor Prince as the foundation of a new Sailors' Home, plans of which had already been prepared, the existing building having been found entirely inadequate to meet the constantly increasing requirements of the port. The foundation-stone was accordingly laid by his Royal Highness, in the presence of Sir Seymour Fitzgerald, the Governor of Bombay, and a large concourse of natives and foreigners of distinction. Eager to signify their appreciation of so auspicious an event as the visit of a royal prince of England, some of the native princes subscribed largely to the funds; the Guicowar of Baroda alone contributing the munificent sum of 20,000*l.* In consequence, however, of some misunderstanding in regard to the site, the building has not yet, we believe, been proceeded with.

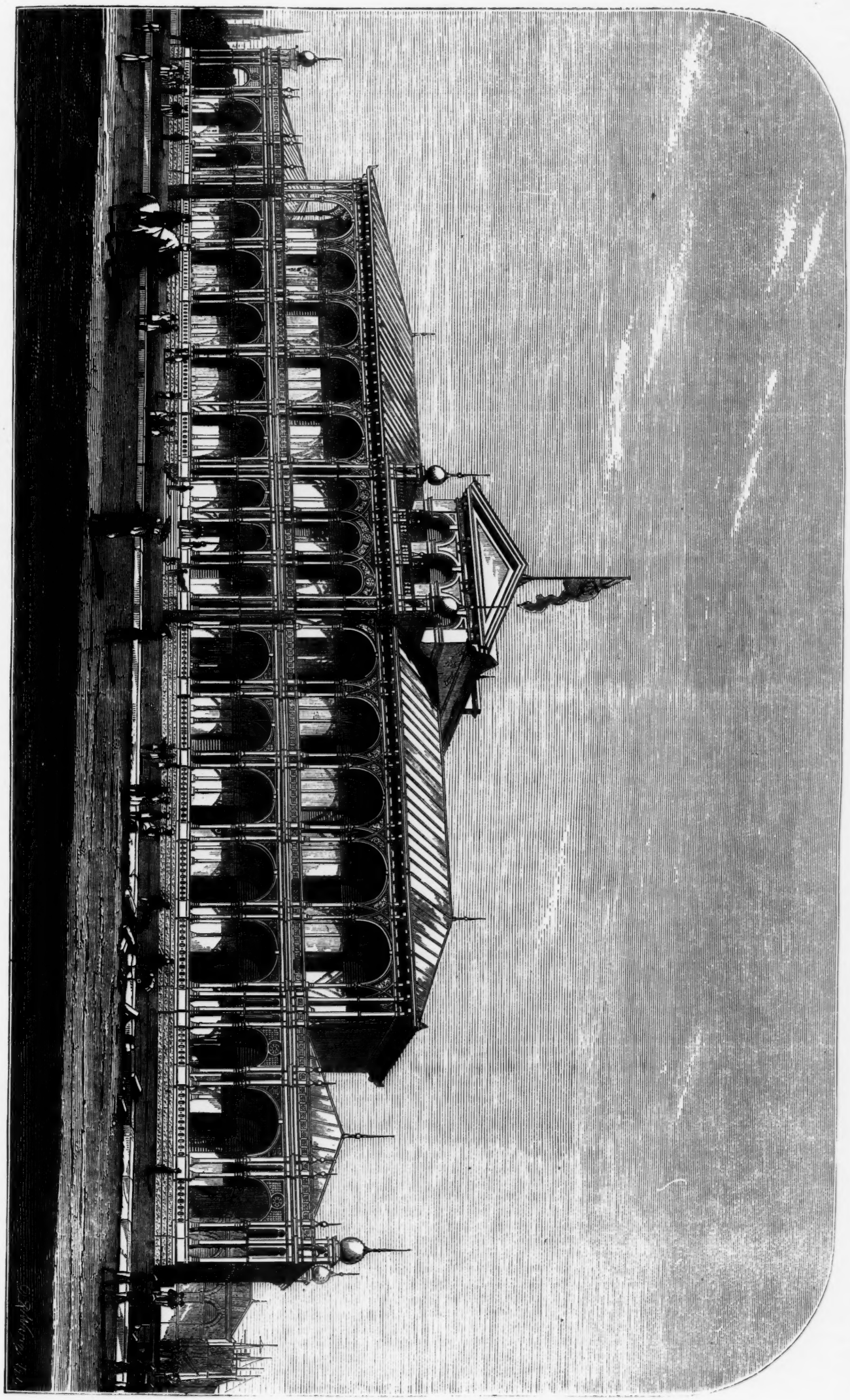
We give a general view of the proposed new Home, with a plan of the ground floor, as designed for the site originally given by Government, on the Colaba-road, which possessed a frontage towards the sea of 300 ft., with a western aspect. The central block and south wing comprise complete accommodation for 126 seamen; the north wing is devoted entirely to officers' quarters; and the Home master's residence is placed in the attic story, in the centre of the building. The kitchen department is placed in the north-east; and the lavatories and earth-closets for seamen in the south-east angle of the site, communicating respectively with the main building by means of covered corridors. Wide verandahs encircle the whole edifice to the west and south, and smaller ones at the back. These it is proposed to construct entirely of iron, which would be made in this country and sent to Bombay ready to fix. The floors throughout are to be constructed with rolled iron joists and cement concrete. The windows are, in all cases, to have double casements, the one glazed, and the other "Venetian." The roofs are designed to be constructed throughout of iron, covered with Italian zinc, laid on solid boarding; and special precautions have been taken to secure thorough ventilation, and to provide against discomfort (particularly in the dormitories, which occupy the whole of the upper story) from the great heat of the climate. It should be stated that the plans have been so arranged that, by the addition of either one or two stories to the north and south wings, the amount of accommodation might easily be doubled.

Estimates for the ironwork have been obtained from Messrs. Andrew Handyside & Co., of Derby; and the whole has been designed by Mr. J. Macvicar Anderson, of London, architect.



SAILORS' HOME, BOMBAY.

Plan.



SAILORS' HOME, BOMBAY.—Mr. J. Macvicar Anderson, Architect.

SASHES AND SASH-HANGINGS.

Sir,—The discussion that has already taken place in your columns is of so interesting a nature, that I beg you to allow me to say a few words on the subject of sashes generally.

The question appears to me to be under three heads:—

1st. What kind of sashes shall be used.

2nd. How they shall be hung.

3rd. What they shall be hung with, and other such details.

The first question is conclusively answered by your note to the letter of "M. H." (Sept. 17). Climate is the great regulator of such matters, and ours, a mixture of about eight parts of bad to four parts of good, forbids the general use of French casements, which practically have no medium between being either quite open or quite closed. The second question is also almost settled by the same consideration. The idea of balancing the sashes by each other's weight is by no means new, though constantly reappearing. Your correspondent, "A Working Man," has discovered it for himself. "The Experienced Mouse" has used it long ago, and Marygold's patent rack slips are essentially on the same plan. In all these the abolition of the weights is gained by the loss of independent action, and this is attended by a total loss of comfort in winter time. The other idea of using springs instead of weights is unpractical, and fitted only for models, as a few figures will show. Suppose a top sash to weigh 30 lb., the springs must be sufficiently strong to produce a friction rather greater than this, say 35 lb., and a pull of 5 lb. will then suffice to draw down the sash. But, on raising the sash, it is necessary to apply a force equal to the weight of the sash *plus* the friction caused by the springs (for these act equally in going up and coming down), requiring therefore a push of 65 lb. The various contrivances spoken of by the "Mouse,"—the facings of leather, cork, &c., are all of this class, and subject to the same defect independently of workmanship, which, if bad, may add indefinitely to the power required.

Mr. Bullivant's sash, so curiously supposed by "A Working Man" in his last letter to be the ideal of "G. L.," is a very ingenious modification of the double-hung sash, and much facilitates cleaning, &c.; but since this is accomplished by temporarily detaching the weights from the frames, a great inconvenience results in its application to heavy plate-glass windows.

The balance of advantages being so strongly in favour of the ordinary double-hung sash, the third point is with what to hang them. The choice lies, so far as I know, between common and special sash-line, copper chain, copper-wire cord, catgut, leather cord, and Sawyer's rack slips. These last are a modification of Marygold's slips, in which the weights are retained. Toothed slips are fitted to each side of the sash, and gear by small pinions into corresponding racks on the weights, a very unnecessary amount of trouble and cost, merely to avoid using sash-lines. Of the others named, leather cord is somewhat weak for its size, as compared with best sash-line; catgut gives way soon, copper-wire cord even sooner; copper chain is very good, if carefully soaked in oil, to ensure all the joint-pins being oiled. I have known a large chain cut through in three months, owing to a "dry" pin. Its disadvantage is that when the sash, at any subsequent time, is taken out of its frame, the chains often get badly wrenched sideways, by carelessness, and are then permanently injured. On the whole, I prefer the best flax-thread sash-line (ordinary jute-mixed fluffy sash-line is mere rubbish), and would recommend it to be well served with tallow, or some such preservative before use.

The system of hanging sashes to conceal the "frightful ropes" so mysteriously learnt by "the mouse" has one great defect. He says, under this plan "the weights will go down much further than usual,"—apparently an advantage; it should read, "Will require to go down much further;" in other words, the side-frames of the sash must be carried down below the sill, to—say, the floor-line, involving considerable extra cost, and spoiling the building up of the frame.

Is the double-hung sash, then, perfect? By no means. Much has been done, by avoiding painted sash-frames (in best houses), to allow the sashes to run freely, as it can scarcely be expected that a sash, originally properly fitted to a groove, will work comfortably after that groove has been reduced by the thickness of three coats of paint now and then. But a sash that shall be permanently free running, thoroughly watertight, and easily removed and replaced by ordinary servants, for cleaning, &c., has not yet been brought out. I do not speak of metal sashes, as their great cost is simply prohibitory.

The best thing to do is to provide a ready means of working the present sashes; but these, sir, are not advertising columns, so I will say no more on that point, remaining, W. M.

In addition to the material for hanging sashes mentioned by "W. M.," we take the opportunity of mentioning Mr. Hookham's Patent *Steel Ribbon Sashline*. This is formed of a double band of watch-spring steel covered with a close binding of copper wire, and protected inside this binding with a water-proofing preparation. It claims to be superior to the lines now in use in every respect. Hemp lines become harsh through the action of the atmosphere, and are always breaking. Wire lines are unadapted for running over small pulleys; and chains are, if well made, too expensive for the purpose. It is claimed for the steel ribbon sash-line that it is not liable to be affected in the same way as the hemp line. Secondly, the thin bands of tempered steel bend over the pulley and become straight again without injury; at the same time that their breaking strain is astonishingly high. Thirdly, sashes hung with this line run with great freedom. It seems to deserve a trial.

THE ROYAL ARCHÆOLOGICAL ASSOCIATION OF IRELAND.

This Association—late the Kilkenny Archæological Society—held its October meeting on Wednesday, the 5th. New members were elected.

The secretary called attention to the appeal of Sir William Wilde through the press for subscriptions to form a fund to prevent further desecration at Roscommon Abbey, and repair that interesting ruin and the O'Connor Tomb; as also to the movement of the Rev. R. Richey, Ardmore, to rebuild, by subscription, the conical portion of the summit of Ardmore Tower—at present in a very perilous state,—using the original stone for the purpose. Both were most heartily approved of by the meeting, as the restorations proposed were in safe hands with the two gentlemen named.

Mr. Robertson, Hon. Curator of the Museum, reported the safe arrival of a quantity of curious pieces of ancient timber, oak, and deal, which had formed a framed structure in the Crannoge in Ballydoolagh Lough, and was presented by the Earl of Enniskillen.

Mr. Watters, Town Clerk, Kilkenny, exhibited some ancient documents from the Municipal Archives at present in his keeping, which seemed to excite a good deal of interest amongst the members.

THE PRINTERS' ALMSHOUSES, WOODGREEN.

On Saturday afternoon, a large number of the subscribers and friends of this institution assembled at Woodgreen, to witness the ceremony of laying the foundation-stones of two new wings to the almshouses; that of the south, or commemoration wing, being laid by Mrs. Figgins, widow of the late treasurer; and that of the north, or "Maries" wing, so called after the wife and daughter of Mr. J. Wright, of Kingston-upon-Thames, who bequeathed a sum of 2,000*l.* to the institution for the purpose, by Earl Stanhope.

The architecture of the wings will be Tudor Gothic, and the estimated cost is 3,334*l.*, all of which has been obtained; but donations are earnestly requested, in order to endow the new buildings. The north wing will contain residences for the accommodation of ten married couples, and the south for six widows. There will be thus sixteen additional residences; and although there will be ten on the north side, and only six on the south, the wings will be of the same length, inasmuch as the former will have rooms back and front, and the latter will have them all in front. The architect is Mr. Charles Bell, Strand; and the builder is Mr. W. Henshaw, of City-road. The buildings are expected to be completed for habitation early in February next.

The Printers' Almshouses, which sprang from the Printers' Pension Society, was instituted in 1841. After eight years' successful operations, sufficient funds were accumulated to erect a residence capable of affording an asylum for twelve aged and infirm printers. The foundation of this, the original building, was laid on the 11th of June, 1849, by the present Earl Stanhope, then Viscount Mahon. Owing to many adverse circumstances, the building then commenced was not completed for several years. On the 11th of June, 1856, the elected inmates took possession of their respective apartments for the first time. Since then there has been a regular succession of inmates, and the only drawbacks to the benevolent operations of the institution have been want of house accommodation and want of funds. The inmates are provided with every domestic comfort that they could reasonably expect. As a certain subscription to the funds of the institution is a condition of admission, the inmates may be said to be reaping the benefit of their own provident habits in early years.

ST. PAUL'S CATHEDRAL.

Sir,—In an article in last week's *Builder*, on "British Museum Restorations," it is said that the restorations of St. Paul's Cathedral consist of painting it with several coats of oil-colour.*

This remark seems calculated to convey a wrong impression of the intention of the Dean and Chapter, and the Committee.

A good deal of old oil-colour has of late years been removed, and none put on, except as a necessary ground for gilding. The intended decorations will assuredly not be in oil-colour, whatever other method may be adopted; and it is the desire of the Committee to use principally mosaic and marble.

The restoration of Sir James Thornhill's work in the dome, which was done nearly twenty years ago, may indeed have given some colour to the remark; but the dull effect of this painting has had a powerful influence in suggesting the use of mosaic in what is intended, and indeed commenced. Even the restoration of the paintings in the dome referred to was not, strictly speaking, in oil-colour, but with the use of a so-called encaustic vehicle, in which wax is an important ingredient. F. C. Penrose.

A PROTEST.

David, the King, refused to offer unto the Lord his God of that which cost him nothing.

The generous old Hebrew sentiment is still alive with us Christians, even in *this* age of vanity, falsity, and outside show, as proved by many a noble instance of heroic endurance and steadfast self-spending; but, alas! the reverse is also to be found among us.

When I read in the *Times* of October 3rd, that, possibly with some strangely-perverted notion of acting charitably and benevolently, some persons had sent to the Society for Aiding the Sick and Wounded, many bales of filthy, greasy rags, that were obliged to be burned as quickly as possible, for fear of infection being produced by them, I said, "There must be some mistake here. No English women, let alone English ladies, *could* have done this: these rags must be the clearings out of some factory, where they have been used for wiping grease off machinery. If any decent woman *had* such things in her house, she would never let them be packed up and sent in that state."

Yesterday, I am sorry to say, my high estimate of what English women can or cannot do was somewhat shaken. I went to see the works of art in Bond-street that have been gratuitously presented for the relief of German widows and orphans during the present war. Of the bad taste of English neutrals making any distinction between French and German sufferers, when *relief* is the subject under consideration, I need not speak, that matter having been already commented upon in the *Builder's* pages; but in no paper have I seen any honest criticism on the works exhibited; and therefore it is that I trouble you with these few lines.

With the exception of the pictures of our talented Princesses; Carl Haag's beautifully truthful old head; P. Levin's touching little bit, "Unterstützung für Wittwen und Waisen;" A. M. Caswell's "Bullslaughter Bay;" Couldery's "Harold;" Hoyoll's "Ferdinand Freiligrath;" Dighton's "Lodge Gate at Aldermaston;" Volck's "Von Moltke;" Miss Farmer's "Sketch;" Helander's genre picture; Helen Miles's "Design

* Not exactly.—Ed.

for Decorative Painting" (though wanting in correct drawing in parts); Von Schmidt's "King of Prussia;" Chase's interior of "Dunkeld Cathedral;" and a very few others, all the works are of the most ordinary kind.

From these, a second exception must be made of those that are of an extraordinary kind; that is to say, extraordinarily bad. What *can* be the use of either painting or exhibiting such rubbish as Nos. 57, 81, 146, 221, 224, 232, and 234? I know we are told "not to look a gift-horse in the mouth"; but in this case the "gift" is no "horse" at all, nor even a Jerusalem pony; nothing but a wretched make-believe. People must not be allowed to "lay the flattering unction to their soul" that by giving such trash as this they are doing an act of charity. The soiled and commonplace engravings and drawings in the large portfolio at the Exhibition, with a few very special exceptions, must also not escape without their meed of censure. If the sickening rags sent to St. Martin's-place were the sweepings of houses and factories, much of the *Art* (?) to be seen at the Bond-street collection is assuredly the clearing out of studios and portfolios.

To the misjudging donors of this trash I commend the study of the sentence with which I commenced this letter, and subscribe myself yours dejectedly, ONE OF THE PUBLIC.

TAR PAVEMENTS.

IN reply to your correspondent, "S. M. F.," I send you a specification of the mode of laying tar pavement which I and many other surveyors have adopted, and found completely successful.

For Carriage-way.—A layer of good dry brick-rubbish, 8 in. thick, well rammed (if a gravel foundation this need not be used), Kentish rag stone, or the chippings from granite, are the best material.

For the tar pavement the stone for the lower bed should be broken to pass through a sieve of a 3-in. mesh, to be well coated with hot Stockholm tar, to be laid 6 in. thick, and well rolled. The next bed is to be broken to pass a 1½ in. mesh, to be laid 2½ in. thick, and well rolled. When nearly dry, broken gypsum to be scattered over it, and well rolled: this gives a bright look to the pavement.

For Footways.—Brick-rubbish, 5 in. thick; lower bed, 4 in. thick; next bed, 2 in. thick; and gypsum as before.

Your correspondent may see this pavement at the Royal Arsenal, Woolwich.

THE LAYER OF THIS PAVEMENT.

NEW BATHS AND RESERVOIRS, HARROGATE.

THE Harrogate Improvement Commissioners have determined to erect a large suite of baths and reservoirs upon the Victoria Baths estate, at an estimated cost of 10,500*l*. The plans have been prepared by Mr. J. Richardson, town surveyor, and the buildings will occupy the site of the gardens lying on the side of the Victoria Baths, and between Promenade-terrace and Cheltenham-square. That portion of the land which is not covered by the new buildings will be converted into pleasure grounds. The central portion of the building, on either side of the main entrance, will consist of waiting-rooms, one for ladies, the other for gentlemen, with separate entrances to each. The principal entrance leads to the manager's office, built upon the circular plan, so as to command a view of the whole interior of the establishment, including the entire length of the corridor, which is 8 ft. wide and 200 ft. long. Behind the office is the house of the manager. The bath-rooms are placed on each side of the corridor: those in the corridor to the right, or east of the entrance, are ladies' baths, and those to the left or west of the entrance are for gentlemen. The whole of these bath-rooms are 10 ft. by 11 ft. each. Attached to these bath-rooms on one side of the corridor is a dressing-room to each, and on the opposite side two dressing-rooms to each bath-room. Each dressing-room contains a water-closet; and in each wing provision is made for two shower and two vapour baths. At either end of the long corridor is a swimming-bath; that on the east or ladies' side being 47 ft. by 17 ft., with six water-closets and four dressing-rooms. At the opposite end, the gentlemen's swimming-bath is 68 ft. long by 17 ft. wide, with three water-closets and seven dressing-rooms. The walls and floors throughout are to be tiled, plaster being wholly excluded. The roof is an open one and boarded. The swimming-baths from top to floor are 28 ft., and the baths and dressing-rooms are 16 ft. in length.

FLAT ROOFS.

IN our number for the 13th of March, 1869, we spoke on the fireproof properties of asphalte, and particularly with reference to some experiments that were made by Sir Henry Ellis and others upon some asphalte that was laid by Claridge's Asphalte Company. The material from this same company is being employed by Messrs. Lucas, Brothers, to the extent of about 60,000 feet superficial at the Albert Hall of Arts and Sciences, and at the buildings for the International Exhibition, Horticultural Gardens, South Kensington. This shows good confidence in the application of such material to flat roofs. It promises to make a capital job.

THE HOLYHEAD BREAKWATER.

WITH reference to a notice in our last issue, the men at work on this undertaking are under the superintendence of Mr. Caldwell, for Messrs. Rigby & Co., of Westminster; not of Mr. Williams, who is the foreman of the works. We learn from Messrs. Rigby that the advance lately made is even greater than we stated, the masonry at head and the lighthouse are now 17 ft. above high-water spring tides.

LIVERPOOL ARCHITECTURAL SOCIETY.

THE first meeting of the present session of this society took place last week, at the Royal Institution. The chief business of the evening was the president's inaugural address. In delivering this, Mr. H. H. Vale took a hasty view of the architectural and sanitary events in progress in Liverpool. Touching upon the high death-rate which distinguished the town in an unenviable sense, he observed that the system of sewerage adopted in Liverpool was one of the most costly, though the situation of the town was one of the most favourable for carrying out an efficient system of sewerage. The old Romans maintained that sanitary cleanliness was a continual improvement; but he regretted to say that our public thoroughfares were still left in the most filthy condition, notwithstanding all our boast of sanitary progress. He was glad to believe that Liverpool was gaining a higher character for her street architecture and public buildings. With reference to matters of art, he regretted the course taken by the Town Council in regard to the long-talked-of Gallery of Art. Speaking generally of the prospects of their profession, he believed that the latter half of the nineteenth century would see a great improvement in the adoption and practice of the purer styles of architecture than had prevailed for some centuries. He rejected the idea of a new and specially distinctive style in the present condition of architecture. We were more successful and more likely to excel in restorations of the best forms of former styles. As to the inception of a thoroughly original style, he considered the French or the American republicans as the only people likely to work out such a resolution. Reverting to the ecclesiastical architecture of this town, he remarked that he was not a believer in the immediate necessity of a Liverpool cathedral.

Mr. T. H. Wyatt, who was present, said, in allusion to the forthcoming international exhibition connected with architecture, that the correspondence between the Institute of Architects and the authorities of the Kensington Museum had resulted so unfavourably that the Institute had determined to have nothing to do with the arrangements. The storm might blow over, but that was the unfortunate state of affairs at present. On another point of the president's address he expressed an opinion that it would be for the benefit of the whole country if there was a uniform Building Act.

Mr. J. Boult, in moving a vote of thanks to the president for his address, said that with reference to the remarks on councils of conciliation and arbitration for the building trade, he could convey to the public a piece of information. About eighteen months ago a proposal was made by the masters in Liverpool to the operatives to establish such councils, the proceedings to be private and regarded as a private understanding between the masters and the men, and a fresh Board to be appointed in each case of dispute. That proposal was, unfortunately, rejected by the operatives. They did not at that time thoroughly understand the principle of arbitration, and they were afraid of being prejudiced. About three months ago, however, the men having, to use the phrase made famous by a late prime minister, been educated up to a certain point, made a proposal to the Master Builders' Association to establish courts of conciliation under the provisions of the Act of Parliament. That was met by a reminder from the masters of their former proposal, and to this the men rejoined that the court which would have been established under that proposal was to be private and without any recognised legal authority. They said they would have more confidence in a court established under the provisions of an Act of Parliament, and with its proceedings open to the public. Since then the masters had again had the matter under consideration, and he regretted to state that they had just decided to reject the proposal of the operatives.

Mr. H. H. Statham, the hon. secretary, gave some interesting particulars, derived from an afternoon spent that day in Chester, of the present position of the restoration work at the cathedral, particularly mentioning the discovery and intended utilisation of a curious Norman relic adjoining the western entrance to the nave.

STAIRCASE HANDS.

A "Staircase and Handrail Hand" writes to defend his fellow Staircase Hands against what he fancies a slight thrown on them by previous correspondents. This, however, is quite unnecessary. The writer says, in the course of his letter, what many will be sorry to hear, and, we are afraid, is not to be denied,—

Perhaps I can tell your correspondent what may rather surprise him, viz., that the continued handrails made more than fifty years ago—take them generally—were better executed than a great many done now, for the very reason that they were made by men in good practice. In most of the former, the wreath is much more graceful than in the latter because they were done by men who had devoted their *whole time* to the business, and not by men who set themselves up as staircase hands but knew very little about it,—by this means many good jobs are now spoiled. I do not object to theory, but only say that without practice it is of little use. Why I write this is that we, who are only the poor artizans, should be dealt with fairly, and not held up to ridicule.

I will make one remark on Mr. Riddell's book; that is, that the mode he sets out for placing the "riser" of winders so as to make it better for the soffit-strings and handrails, has long been the practice of all good staircase hands, though I am aware they are seldom drawn so by the architect, but left to the practical man.

I beg to add that should his work enable a man who could not master the difficulties of the art by the aid of the older works, now to acquire it, I, for one, shall not be sorry. But still I cannot believe that an inferior intelligence and less ability will be required, and your correspondent of September 24th will still have to complain of a "monopoly;" the monopoly which superior skill, ability, and experience always have and always will hold.

A STAIRCASE AND HANDRAIL HAND.

Another correspondent says,—

That part of your article relating to plans of stairs it would be well for architects to read and digest. Staircase-hands are not generally consulted as to the plans of stairs they are required to execute: indeed, it would be considered highly presumptuous by the architect were they to suggest any alteration or improvement to his designs

You charge staircase-hands with being intolerant in requiring a bench. Staircase-hands do not profess to be better or worse than other people, and I think your article unnecessarily severe upon them. Concerning the work under notice, your own observation respecting the system of kerfing will also apply to placing the landing risers of stairs in the cylinder of the half-space and level landing description.

I have seen it done; I did them so myself years ago. You will even see it in the 3s. 6d. Book of Drawings for Carpenters and Joiners, lately issued. With regard to the general system of lines, any young man in the trade with average capacity, and who does not mind spending a little, if he cannot find out a better paying game to enhance his worldly interests, will do well to study this, and he will not regret the time devoted to its pages.

Your correspondent, "F. D.," complains of monopoly by staircase-hands. His reasoning I do not exactly see. Monopoly of what? Of doing that which he and others are not competent to do. If the sentence ran thus,—"And so ends an indifference which is a disgrace," &c., it would at least be intelligible. His remarks about St. Paul's and the scene-painter are equally absurd; as in either case the job would be simply spoilt,—a very good reason for not intrusting them with it. Whatever the privileges and exactions of staircase-hands of the olden times were, those of the present are not so fortunate, and I maintain that a thorough good man in this line who can execute his work on the newest methods, from drawings (and there are such men), without trouble to the manager or anxiety to the master, is deserving of more pecuniary reward than he at present receives, and which he has a perfect right to expect. A. B.

A THREE-BRANCH HAND.

SIR,—Architecture is evidently looking upside down, and ye architects may soon go and hide your diminished heads.

Read the following reassuring piece of manful assurance which has just appeared in one of your daily contemporaries:—

"A GENTLEMAN, who has recently built a Country Residence, is desirous of RECOMMENDING to any one about to build, a clever FOREMAN, who has manfully carried out the duties both of Architect and Builder to the entire satisfaction of the advertiser."

After this, who, with a little money to throw away, would not build? No premiums, or percentages, or "architect's man" to act as a spy, or a "go-between." Nothing of the kind; but one who can "manfully" carry out *in globo* the triple duties of "active architect," "experienced builder," and "clever foreman." It cannot be that this gentleman, who has recently built a house in the country, is any relation to his architect and builder. Blood, we know, is thicker than water.

Three-branch hands of the lower strata are not often

above the want of a job, as your excellent pages often sadly show; but it is unaccountable to me how an architect, builder, and clever workman should need a recommendation, as well as a job.

I was a workman myself, and I think I thoroughly understand my trade. Whether I was clever or not I cannot say; I am content to know that I was always in constant employment, while the "Jacks-of-all-trades" in my neighbourhood were always lounging about public-house corners.

Manfully carrying out a job, I believe means boldly, courageously. Well, sir, I have known many a "botch" in my experience to be as courageous as a lion, ready to undertake anything, and, oh, Jupiter! what a Juggernaut of fallen *débris* and butchered materials have not mine eyes seen! With a vivid recollection of many building abortions, I am pleased to remember that I was only

A One-Branch Hand.

"LIFTING HOUSES."

Sir,—This process, as also "Moving them bodily," as you expressed it in a former number, is by no means confined to Chicago, but is a daily occurrence in every city of the United States. In New York you may constantly witness removals of all kinds; one day lifting a house up bodily, some 14 ft. or so, giving a temporary strange appearance, with the street door up in the air, as it were, while building a large store or ground-floor below, and up to it. There is no difficulty whatever in the matter. The writer has had considerable experience in New York in all this sort of thing, and would think no more of putting in an estimate and contract for a removal of any extent than he would for the most ordinary building transaction. He has seen a row of houses moved from one side of a street to the other, the same having to be turned wholly round in the process, and this in New York, where the soil is a treacherous compound of rocks and sand. As a constant subscriber, I enclose my card, and am, Sir,

Contractor.

CASES UNDER METROPOLITAN BUILDING ACT.

THE GROUND STORY.

At Hammersmith Police-court, Mr. Yates, jun., of Mary-street, Shepherd's-bush, appeared before Mr. Dayman, to answer an adjourned summons, at the instance of Mr. Knightley, the district surveyor of Hammersmith, for constructing chimneys upon corbels at the ceiling level of the basement.*

This case has been adjourned several times, and had created considerable interest in the profession, in consequence of the magistrate having expressed an opinion that the ground story of a house was that which was next to the footings. That was also the defendant's view of the question, which was the point he raised, but Mr. Knightley said it was commonly understood by the profession that the ground story was the same as the ground floor, which was on a line with the road. The case, however, stood over for further consideration, and in the mean time articles were published, and letters written by surveyors and architects, all pointing out that the opinion was wrong.

Mr. Dayman now said that he had not read any of the articles, in order that he might arrive at an opinion founded upon the construction of the Act of Parliament. Having read several sections, and pointed out to the defendant the interpretation to be put upon them, he said that he had arrived at the conclusion that a ground story was the ground floor. He then made an order as prayed, in effect to remove the present chimneys, or carry up a brick pier from the foundation.

The defendant at first intimated his intention of appealing, but afterwards consented to abide by the order.

SHEFFIELD.

The New Music-hall.—At a meeting of the directors of the Company for the Erection of a new Music-hall, an account of which we have already given, a letter was read from the Duke of Norfolk, offering a donation of 200*l.* towards the erection of an organ for the large hall. The meeting was then made special, to consider the best means of obtaining a grand instrument, equal to any organ in Yorkshire. The following makers were named as likely to be asked to send in specifications and tenders, viz.:—Cavaillie Coll & Co., Paris; Shultze, of Germany; Willis, of London; and Brindley, of Sheffield. The cost of the instrument is not to exceed 2,000*l.*, and a sub-committee was appointed to make inquiries. The share-list, we are informed, is increasing, thirty new shares having been allotted since the corner-stone was laid, on the 1st September, 1870. The building is in a forward state, and will, it is expected, be roofed in by January, 1871.

The Proposed Public Museum.—At a recent meeting of the town council, the Free Library Committee were instructed to report on the desirability of a public museum being established in and for the borough of Sheffield; and that committee unanimously decided to recommend the council to establish such a museum. As to the ways and means, they were of opinion that all the council would be called upon to do would be to purchase or erect a suitable building for the museum, to pay the salary of a curator, and the expenses incidental to keeping the museum in a proper condition. The foundation of the museum would be the collection belonging to the Literary and Philosophical Society. A suitable building, the committee thought, could not be obtained for much less than 5,000*l.* (which amount could be borrowed under the Libraries and Museums Act), the interest upon which would be between 160*l.* and 200*l.* a year. It was estimated that the annual cost of keeping up the museum, inclusive of interest upon the borrowed capital, would be about 500*l.*; and the committee, we understand, propose to raise this sum and also the amount required for the establishment of a branch library somewhere in the neighbourhood of Brightside and Attercliffe, by levying a penny library rate instead of a three-farthing rate, as is now the case. So largely had the rateable value of property in the town increased that it was thought the extra rate would produce somewhere about 2,500*l.*, and that allowing 700*l.* for the expenses of the two branch libraries—the one already existing at Upperthorpe, and the one to be established at Brightside—there would be a balance of about 500*l.* to be appropriated for the purposes of the museum.

* A report of the first hearing will be found at pp. 669 and 711, *ante*.

CELLAR TRAPS.

Sir,—Why publicans' cellar-trap-boards should be allowed to encroach across the pavement is a mystery. In some cities it is not permitted; in London, we are oft, to avoid barricades of tubs, barrels, stretched ropes, and rolling casks, forced to take to the road. The owners of these *traps* (tender-hearted "pubs.") stud them with gigantic conical hobnails. To torture tender-footed pedestrians is a crying wrong. Many of these rotten traps will not stand the dead weight of a live man; so perhaps it is as well to steer clear of them.

R. T.

LONDON BUILDERS' SOCIETY.

The following is a copy of an agreement lately come to by the members of the London Builders' Society:—

"The members agree that they will not tender for any works in competition, the quantities of which have not been taken out by a surveyor agreed on by the builders at a meeting of the competitors.

They further agree that they will not sign any legal contract for works obtained in competition that does not contain a full and fair arbitration clause.

It is also very important to point out the meaning and intention of clause 7 of the conditions of contract as agreed to by the Council of the Institute of Architects, which is that 'priced bills of quantities' are not to be demanded from builders, but variations from contracts are to be estimated according to an agreed schedule, or at fair measure and value.'

ACCIDENTS.

London.—Two accidents have occurred at the Hall of Arts and Sciences, now erecting at Kensington. The first was to a painter. The man was at work in the upper part of the building, and while so occupied dropped his brush down a large shaft. This shaft ascends from the ground to the top in a sloping and zig-zag manner, and contains several bends or angles. The painter, thinking his brush might have lodged upon the uppermost edge, leaned over, but losing his balance he was precipitated headlong into the shaft about 50 ft. It was impossible for any one to follow, and no one knew in what part of the shaft the man was, or whether he was alive. Great excitement prevailed amongst the men, as the brickwork at the bottom is of an immense thickness, and if broken through might jeopardise the safety of the upper structure.——The other case was that of a lad about fifteen, who was lathing for the plasterers, when the plank he was standing on gave way, and he fell about 15 ft. on the edge of a large tub beneath, and thence into the water. He fell upon his chest, and the injuries he received are likely to prove fatal.

Glasgow.—Mr. David Law, sen., and Mr. David Law, jun., builders, have been apprehended on a charge of culpable homicide, in connexion with the recent fall of a portion of a house in course of erection at Hillhead. They were afterwards liberated on bail of 200*l.* each.

Edinburgh.—A plasterer, in the employment of Mr. Baird, Pitt-street, has been killed, while engaged on a new building at Warrender Park. He ascended a scaffolding about 10 ft. in height erected in the stair of the building. While ascertaining whether the plaster was dry he felt the scaffolding moving, and in order to maintain his balance he leant backwards. Before he was able to recover himself, however, he fell, and, his head striking the stone steps, he was picked up insensible. The poor fellow was conveyed to the Royal Infirmary, where he died.——A mason, while employed repairing a chimney on the top of a five-storied building in Chester-street, overbalanced himself and fell to the ground from a height of about 50 ft. He was picked up insensible, and removed to the Royal Infirmary, where it was found that he had sustained a severe fracture of the skull.

SURVEYORS' CHARGES ON THE LAST GOVERNMENT CONTRACT.

Sir,—A rumour is going about, backed by the assertion of one of your correspondents, that the surveyors engaged upon Government work in taking out the quantities for the Home and Colonial Offices have charged 6,010*l.* for their work: this appears to be at the rate of 2½ per cent. upon the estimated cost, viz, 240,000*l.* Considering the character of the building, and its great size and the repetition of parts, about half of such a sum, I believe, would be the usual charge. Such an assertion, I think, ought not, for the interest of the profession to which these gentlemen belong, to remain uncontradicted; and I am sure they will thankfully accept the opportunity of setting the public right which the publication of this will afford them.

As the charges of the surveyor are added to the builder's tender, employers seldom know how they are paid; and this is another reason why the rumour should not continue, or the public may now think they are being charged more than the usual remuneration.

A. B.

*** It is perfectly correct, we are informed, that the surveyors' charges in the case in question amount to over 6,000*l.*, or 2½ *per cent.* on the amount of contract.

HORSE PERILS.

Sir,—I have just read in this day's paper of a fatal accident to three out of four ladies, through a runaway horse. It is possible to remedy this; and I again beg space in the *Builder* to explain my method of stopping the headlong speed of frantic and restive horses. A complete electric apparatus can be purchased in a small case. Let one of these be fixed in an out-of-the-way nook in the carriage, two wires to hook to harness, beneath which have two very thin copper plates properly placed. In the event of a runaway, the driver and inside occupants would only have to press a glass knob to stop instantly the mad career of the strongest horses.

R. T.

P.S.—It could be adopted for equestrians also.

NEW MASONIC HALL, RICHMOND, YORKSHIRE.

If the M.W.P.G.M. the Right Hon. Earl of Zetland has given up his bâton as commander-in-chief; at least he has not retired from the energetic practice of those high Masonic duties which have distinguished him as one of the most popular Grand Masters of England.

On the 23rd of September, assisted by the Provincial Grand Lodge of Yorkshire, he opened the new Masonic Hall in Richmond, for the practice of the ancient rites of Masonry; supplying a want which has been long felt by the brethren in this picturesque old town and its surrounding neighbourhood.

The ceremony of dedication was conducted with all the "pomp and circumstance" befitting the occasion, Dr. Camridge, of York, P.G.O., kindly presiding at the harmonium, with an ability worthy of a better instrument.

The hall, and site upon which it is built, are both the generous gifts of the noble earl to his Masonic brethren.

The hall is situated on a most commanding site in New-Biggin. The end elevation towards the street, and internal decoration, are in the Doric style. In the pediment over the porch the Masonic and Zetland arms are entwined.

The lodge-room is 50 ft. by 25 ft. by 25 ft., and is lighted by a dome in the roof. To the

right and left of the entrance-hall are cloak and refreshment rooms. A system of warming and ventilation has been adapted in the lodge-room, the main cornice of which and the dome-light are enriched with plaster-work.

The whole cost of the building and fittings was about 800*l*. Mr. Christopher Palliser, of Northallerton, was the architect.

THE OFFICE OF WORKS AND ARCHITECTS.

Sir,—I have read with great interest the letter of "A Tax-payer" which appears in your last impression. If it be true that the architects of Government works, who are themselves members of the Institute, have become parties to any agreement by which the Institute regulations are to be ignored, and its position as to the possession of drawings is to be abandoned, I for one am unable to see, unless these gentlemen resign their fellowships, what is the actual use of the Institute. I have no expectation that this letter will induce their withdrawal in such case: the Institute looks, I fear, too mercifully on all such sins of *commission*.

A Provincial Architect.

PURIFICATION OF THOROUGHFARES BY DELIQUESCENT CHLORIDES.

A paper on this subject was read at the meeting of the British Association in Liverpool (Section B, *Chemical Science*), by Mr. W. J. Cooper. In the course of it, Mr. Cooper stated that in many towns the salts have been tried this season, with various results, according to the nature of the roadway; and nearly all kinds of pavement have been experimented on at Westminster.

As soon as the area of the experiment at Whitehall and Knightsbridge was extended throughout the district, the saving in water and labour was at once made evident. By using one ton and a half of salts per day, costing 3*l*. 15s., the labour of ten horses, carts, and men can be dispensed with, costing 4*l*. 10s. (at 9s. per horse, cart, and man), and consequently the quantity of water they would put down is saved, viz., 350 loads of 250 gallons, or 87,500 gallons, which, at 10d. per 1,000 gallons (the average price for water in London), would amount to 3*l*. 12s. 11d. per day, in addition to the saving in labour of 15s. per day, showing a clear gain of 4*l*. 7s. 11d. per day, after paying for the salts.

The importance, in a sanitary point of view, of the use of these chlorides, has, Mr. Cooper said, been clearly established. "The deliquescent chloride of aluminium, recently introduced to public notice by Professor Gamgee," he continued, "seems to meet all the requirements needed in the antiseptic of the future, and I propose to add a sufficient percentage of this chloride to my patent salts for street watering."

STAINED GLASS.

Gloucester Cathedral.—Three painted glass windows have just been inserted in St. Paul's Chapel, the restoration of which is being carried out at the cost of the Earl of Ellenborough. They are the work of Messrs. Burlison & Gorylls, of London, and consist each of three lights, partially obscured by the reredos. In the centre window is a representation of the Lord, seated in majesty, clothed in a crimson robe and white mantle, and surrounded by an aureola, cherubim, and fourteen angels, kneeling in adoration, and holding palm branches and crowns. In the upper lights are six angels bearing scrolls inscribed "Te Deum laudamus." The side windows, which are an expansion of the central subject, have each ten angels arranged in four tiers, and playing upon various stringed instruments, pipes, and a small organ. The dresses are white, relieved with yellow, and the backgrounds throughout are blue, spangled with yellow stars. In the upper lights on the left are four crowns, and in those on the right four swords. Among the fragments of which the ancient painted glass formerly in these windows consisted were some quarries with the relics of Andrew Whitmay, and a tree or sprig of "white May," with entwined scroll. Andrew Whitmay, after holding certain local livings in the time of Henry VIII., became suffragan to the Bishop of St. David's, with the titular see of Chrysopolis (now Scutari), near Byzantium, and was prior of St. Bartholomew's Hospital, Gloucester.

Clifton Church, Yorkshire.—A memorial window of stained glass has been placed in the south aisle of this Church. The window has two lights, in which are represented Moses with the two tables of stone on one side, and Elias with a scroll on the other, the head lights bearing the monogram J. H. S. The window is from the works of Messrs. Hardman & Co., Birmingham, and has been placed in the church by Mr. Lawson, of Brighouse. The inscription states that it is in memory of the late William Byrne Lawton, of Clifton, and has been put in by his employers, Thomas Robson, Henry Byrne, and Samuel Henry Byrne, of Clifton Bridge, "in grateful appreciation of his faithful services and energetic usefulness." This, says our authority, the *Halifax Guardian*, is the only window of stained glass in the church.

Catton Church.—A two-light window has been placed in the west end of this church. The execution of the work was given by the late Dr. Wright to Mr. Smiddy, of Malton, who has carried out his commission. The subject is Christ Healing the Sick. Beneath the figure is the inscription, "He healed many that were sick of divers diseases;" and in another position "In memory of John Wright, surgeon, born 1792, died 1864; also of Sarah, his wife, born 1798, died 1867."

Sheffield Parish Church.—A new memorial window has just been put up in the chancel of this church. The window is the gift of Mr. Henry Unwin, and is in memory of his brother, the late Ald. Unwin. It consists of six lights, divided into an upper and a lower tier. The upper lights represent the five wise virgins on the dexter, and the five foolish virgins on the sinister sides, the centre light being occupied by a representation of our Saviour as the Bridegroom. Underneath are the words, "And they that were ready went in with him to the marriage; and the door was shut." The three lower lights represent three distinct subjects. The first is, "The Temptation of our Lord," and illustrates our Saviour and the tempter. The centre light contains a large figure of our Saviour, as "The Light of the World," the representation being an exact copy of Holman Hunt's picture. The last light has several figures in it, one of which bears a large sword, and underneath is written, "The Sword of the Spirit." The now only remaining unstained window in the chancel will shortly be filled by a stained window, which will be erected by Mrs. G. Hounsfield, to the memory of her husband. The window just put up comes from the establishment of Messrs. Camm, Smethwick, near Birmingham; and the brass is the work of Messrs. Parkin & Bacon, of Sheffield.

Sharrow Church.—In the south aisle a memorial window has recently been erected by Mr. Parkin, to the late Mrs. Parkin. It has a floriated ornamentation supporting a medallion, containing initials of the lady's name, surrounded by a border of lighter colour. It was executed by Mr. Camm, of Smethwick, near Birmingham. To the same artist is entrusted the execution of the memorial to be erected in the south transept to the late warden, Mr. Whitehead, who died so suddenly.

PROVINCIAL NEWS.

Northampton.—The plans for the new post-office in Abington-street, which have been prepared by Mr. James Williams, of her Majesty's Office of Works, have been sent down to Mr. Wetton. The front elevation of the building, which is devoid of ornament, consists of three stories, with three windows and a door on the ground-floor, and four windows on each of the other stories. On the basement will be the seizure store-room of the Inland Revenue department, store-room, letter-carriers' retiring-room, sorters' retiring-room, battery-room, coal-cellars, passages, stairs leading to sorting-office, &c. On the ground-floor will be the public office, with telegraph desks for the public, the postmaster's room, the sorting-office, telegraph instrument-room, messengers' room, &c. The first-floor will be devoted to the business of the Inland Revenue, and will contain a public office, surveyor's room, room for surveyors' clerks, collector's room, store-closet, lavatory, closets, passages, &c. The second-floor will also be devoted to the Inland Revenue, and will contain a journal office, supervisor's office, store-room, store-closet, lavatory, passage, &c. The work, we understand, will be proceeded with forthwith.

Wolverhampton.—That portion of the new corporation buildings in course of erection which forms the police-barracks is now finished. The barracks are at the rear of the new town-hall, and are approached from Red Lion-street. They will face a spacious drill-ground, and a broad verandah will run along the front of the barracks, which will form one side of the drill-ground. The first room entered is the charge-room, where persons taken into custody will be first brought. The room is large, light, lofty, and well ventilated, and a like description, modified according to requirements as to size, applies to every other room in the barracks. Adjoining are the apartments of the female searcher; while on either side of a long, lofty, and well-constructed corridor there open out inspector's sitting-room, sergeants' sitting-room, general reading-room and library, drill and conversation room, mess-room, kitchen, fitted with large cooking-apparatus, pantry, a drying-room, heated with hot water, and a store-room. A broad flight of stairs leads to some twenty-five bedrooms opening out of a corresponding corridor on the first floor. There are added a bath-room and other conveniences. Some nine months must elapse before the police force of the borough, who live in barracks, can change their present wretched quarters for their new lodgings. At present the principal rooms are the temporary offices of the borough surveyor, the rate-collector, and inspector of nuisances; and the meeting-place of the committees of the town council; and until the whole premises are completed, and the several offices and rooms provided for these officers and purposes are occupied, the police must remain where they are. To form the drill and barrack yard, a large quantity of earth and soil has to be removed. The whole of the works are progressing.

Barnsley.—New Gasworks, erected at Old Mill, for the Barnsley Gas Company, have been opened by the chairman, in the presence of Mr. C. Hawksley, of the firm of Messrs. T. & C. Hawksley, the engineers, and a number of the directors. The works are fitted with all the most modern appliances and improvements, and are capable of making a large quantity of gas. In the evening the whole of the workmen had supper in a large room at the works. Both the new and old works, together with the corn exchange and other public buildings in the town, were illuminated with gas devices on the occasion.

CHURCH-BUILDING NEWS.

Gayton (near Stafford).—The church here has been restored and re-opened. The work of restoration has been done by Messrs. Habershon & Pite, architects, London, and Mr. Whittome, of Stafford, has executed the work. Under the plans Mr. P. Fitzgerald has lengthened the chancel by 11 ft.; the plastered ceiling and gallery have been removed; the roof has been thrown open and lined with stained timber; pews have given way to comfortable benches; and a series of new stone arches, which open to a new south aisle, have been built. On removal of the gallery it was found that there would be a deficiency of sittings. For the building of a new aisle a new fund was opened, and the Earl of Harrowby, the Earl of Shrewsbury, and Miss Moore contributed towards it. A vestry has been also added to the north side of the church. Mr. Habershon says:—"The church retains several features of 'the olden time,' which have been scrupulously preserved. Among others, the fine Early Norman arch, with zig-zag and billet, is of peculiar beauty. It has been carefully restored. There is also a canopied recess in the north chancel wall, containing a recumbent figure of probably the twelfth century. Many old figured tiles remain which have been worked up in the aisles. Every ancient stone and every moulding connected with the church has been preserved and re-inserted. The prevailing style is Earl English."

Accrington.—The church of St. John the Evangelist, Accrington, has been consecrated by the Bishop of Manchester. The church was built about two years ago, to supply an accommodation for public worship which had long been felt in the rapidly-extending district of St. James's. The style is Gothic. The edifice is capable of seating 882 persons, and half of the seats are free. The total cost was about 6,700*l*.; but there remains a debt on the church of several hundred pounds.

Frampton.—The parish church of Frampton has been restored and re-opened after consecra-

tion. The church now consists of nave, north and south aisles, and a triple chancel, with arcades, and the chancel approached from the nave and aisles beneath broad archways. The porch is south, while most of the parishioners live in a northerly direction: it is supposed the southern end of the parish was the more populous when the church was built. But there is a facility of approach to the north door, which is reached through a pleasant avenue of chestnut trees. The earlier portions of the building are in the Decorated style, with modern insertions: the Perpendicular Gothic prevails in the windows and the tower. Last March, the building had to be closed, and soon after the vicar and churchwardens wrote of it that it had been inconveniently built for the purposes of public worship as conducted in modern times, saying:—

"Two large chancel aisles belonged to the lay rector, and were at one time enclosed by railings. Some years ago the vicar obtained the use of them for the parishioners, and they were fitted up with seats. But the blocks of masonry which supported the chancel arch were so large as to impede both sight and sound, and it was determined therefore to take down the arches which gave admission to the chancel and its aisles, and to rebuild them farther to the eastward, thus lengthening the nave and its aisles, and also to extend the central chancel to the eastward, so as to maintain its due proportion, and to provide space for the choristers."

For 1,050*l.* the contractor had then guaranteed to make these alterations and to put the building in a weather-tight condition. But as there was no provision for floor or seats or even renovating the interior of the walls, and the old timber was to be used in restoring the roofs, an additional sum of 250*l.* was required to make the church fit for divine service. As at Minsterworth, the architect of the restoration was Mr. Woodyer, of Guildford, and the clerk of the works Mr. Denney; and Mr. Chapel, of Tring, Hertfordshire, has carried out the contract. The two large side galleries have been taken down; the chancel has been extended 17 ft., and its arches rest on half pillars attached on the east side to the chancel walls and on the west to the piers which form a common support for the arches of the nave and side aisles; the chancel aisles, each lighted by three windows, have been thrown into the nave; the thick buttresses impeding light and sight and sound have been removed to the beginning of the new chancel, and much lessened in size; the walls have been cleaned and replastered; the organ has been removed from the north to the south aisle, while pews for the Court fill the former; there are some seats for the choir in the chancel, and several new seats appear in the church. The pulpit has changed sides. The open-timbered roof has been in part unveiled; and, outwardly, there is a new covering of Tetbury tiles to the chancel and aisles, and the churchyard has been extended. The old oaken chancel-rail remains, and so do the open seats with bench-ends, oaken doors, and linen-fold patterns; and the stone and brick floors have been untouched, but that in the chancel and aisles will be renewed when money is forthcoming. The Perpendicular east window is new, in memory of the late squire, Mr. H. C. Clifford, is by Clayton & Bell, and has the Crucifixion for its central subject; and there are two painted windows in memory of the Watts family. The west window, in the first of the three stages of the tower, has been recently filled by the relatives of Mr. Thos. Watts. The south window bears the date 1734, suggesting some restoration of the work at that time. The stone seems to have been brought from Ireland.

Hanley.—The old Church of St. John, Hanley, has been re-opened, after having been closed several weeks for alterations and repairs. The most material alterations made in the building are the removal of the old ceiling and the substitution of an open woodwork roof. This has not only had the effect of improving the appearance of the interior, but also of diminishing the degree of effort necessary to be put forth by the minister in order to make himself distinctly heard in all parts of the building. The organ has been removed from the western gallery, and two windows therein, which had been built up, have been re-opened and filled with tinted glass. The interior has been cleansed, and repainted in a simple style, and in one or two minor particulars improvements have been made. The cost of the recent alterations is 500*l.* The sum of 450*l.* has already been subscribed towards the contemplated re-building of the chancel.

Tamworth.—Elford Church has been re-opened, after undergoing alterations and improvements, at a cost of about 3,000*l.*, which has been borne solely by the Hon. Mrs. Howard, of Elford Hall. The architect was Mr. G. E. Street, of London, and the builders were Messrs. Charles Clarson & Son, of Tamworth. The church is of very ancient date. The chantry chapel contains a new painted glass window, representing the Ascension of our Saviour, executed after a Dresden design by Messrs. Ward & Hughes, of London.

Everton (*Liverpool*).—The foundation-stone of the Church of St. Ambrose, Prince Edwin-street, Everton, has been laid. The new edifice is intended to meet the wants of the rapidly-increasing population of Everton, and will be an auxiliary to the Church of St. Peter, Sackville-street. The Church and School Extension Society have given 1,000*l.* towards the site and 3,000*l.* towards the building, the cost of which is expected to be about 5,500*l.* Mr. G. E. Grayson, of Liverpool, is the architect, and Messrs. Burroughs & Sons, of Liverpool, are the builders. The style of the new edifice will be Early Decorated Gothic. There will be a nave, chancel, north and south aisle, and two west porches, and sittings will be provided for 700 persons. Ornamented brick will be used in the construction inside and outside.

Southampton.—The church of St. Lawrence, which has been closed for a week or two for cleaning and decoration, has now been re-opened for divine service. The chancel has been decorated from the designs and under the superintendence of Mr. Charles Vaughan, of Southampton. The triplet of pillars supporting the chancel arch are brought out in Aberdeen granite, as are also the pillars that support the groined roofs of the body of the chancel and its apsidal termination, and the pillars supporting the hood mouldings of the three windows of the apse in porphyry. The mouldings of the chancel and apse arches being of an exceptionally plain character, diapering has been employed, the fleur-de-lis (as an emblem of the Trinity) being in the outer moulding, the endless oval (as an emblem of eternity) marking the architrave, a leaf of the soffit edges imparting the appearance to the distant observer of the characteristic tooth-ornament, while the soffit is relieved by the grape and iris leaf (as an emblem of purity). The walls of the chancel and ribs of the groined roof are of Caen stone coloured, the bosses being in vermilion, picked out in blue and gold, and the roof sky-blue. On the semi-sexagonal apse the most elaborate part of the work has been bestowed. The side walls up to the window string-course are in maroon, with gold fleur-de-lis, the centre space being filled by a cross surmounted with the kiro, the candles, and other belongings of the altar. The capitals of the pillars that support the hood mouldings of the windows and the groined roof of the apse are decorated in gold, blue, and red, the ribs—of Caen stone colour—being relieved by a leaf moulding, and the roof itself is in ultramarine blue with white stars. The three single lancet windows are in stained glass, erected some years ago, and have, as the central design, the Baptism, with the Agnus Dei as the dexter and the pelican the sinister lights, and the jambs are ornmented with the iris leaf.

SCHOOL-BUILDING NEWS.

Abington.—A new school for the parishes of Great and Little Abington, built at the sole expense of Mr. E. J. Mortlock, has been opened by the Vicar of Great Abington. The school consists of a main room, 40 ft. by 18 ft., and also a class-room, 15 ft. square. It is built of red brick, the window-cells being of Ketton stone. By the liberality of the same gentleman the chancel and greater part of the nave of Great Abington church have been entirely reseated. A field also has been granted by Mr. Mortlock as a recreation ground for the use of the poor of both the Abingtons.

Bristol.—The new building in St. Philip's, intended for ragged schools, mission church, and soup kitchen, according to the local *Times*, is nearly completed. It consists of two large rooms, with class-rooms annexed, capable of accommodating nearly 400 children. Under the class-room is a soup-kitchen, now being fitted up. A small playground has also been secured. One of the class-rooms has been opened for mothers' meetings and serving classes; and the boys' room will be opened as a day, night, and Sunday school as soon as possible. An appeal is made for funds.

Hyde.—The corner-stone of St. George's new school has been laid. The school, which will be entirely of stone, will be built in a Gothic style, and will contain three class-rooms. It will be 100 ft. by 40 ft. in extent, and will accommodate about 800 scholars. The total cost will be 1,150*l.*

Worcester.—St. Clement's new Boys' School-room has been opened. It is built on a space hitherto used as a playground, and adjoining the present schools. The ground was somewhat irregular in shape, but Mr. Ernest A. Day, the architect, has made the most of it. The front wall is close up to the line of Church-walk, the entrance being at the end near to that by which access is obtained to the existing schools. A space of 9 ft. at the end has been reserved for a porch and cloak-room, the remainder being the school-room, the dimensions of which are 47 ft. by 20 ft. The roof is an open one, the interior height being 12 ft. to the wall-plate, and 28 ft. to the apex. The dressings of the building are stone. The school affords accommodation for 117 boys.

Manchester.—The foundation-stone of the Albert Memorial Church Branch Schools has been laid. The site is at the junction of Sanderson-street and Rowbotham-street, and contains 12 square yards. There is to be a mixed school, with porch entrances from Sanderson-street, and class-room adjoining, and an infants' school with separate porch from Rowbotham-street. Built in the Gothic style, the edifice, which is to be about 75 ft. long by 26 ft. wide, will be faced with selected bricks, and relieved with coloured bricks. Adjoining the school building a teacher's residence will be erected. The plans have been prepared in accordance with the requirements of the Privy Council, and each of the rooms is well fitted, affording accommodation for 231 children. Playgrounds will also be provided. The cost, including inclosure walls and fittings, is 1,250*l.* Messrs. Wade Brothers, of Miles Platting, are the contractors for the whole of the works, under the superintendence of the architect, Mr. John Lowe, Manchester. The building will cost about 800*l.*, towards which Government has given 250*l.* The site, worth 400*l.*, has been presented by Mr. Howarth, of Bristol.

Kennington.—The first stone of a National new School-room has been laid at Kennington. It would seem that the Regency-square School has been established about fifteen years for the education of boys and girls in connexion with the Established Church. Lately the number of scholars has greatly increased, and this fact, together with the necessity of having separate schools for the boys and girls which did not heretofore exist, made it desirable to build another school, and accordingly a piece of ground at the rear of the present school was selected for that purpose. The building is to cost 600*l.* The architect of the school is Mr. Charles Gould; and the builders are Messrs. Nixon & Sons.

Hollington.—A new school has just been built in this village, and opened. The school, with a class-room and master's house attached, has been erected at a cost of 900*l.* It is in the Elizabethan style, of Hollington stone, rock faced. Mr. Christian, of London, is the architect; and Mr. William Thorley, of Ellastone, the builder.

Luddenden Foot.—The corner-stone of the new schools near to Blackwood Hall, just above the station, has been laid. The schools are to receive 300 children. These schools are being built after the designs of Messrs. Parr & Strong, London, and they are to consist of mixed and infant schools, with master's residence. The larger room when ready is to be used for divine service on Sundays, until the completion of the church, which is to be commenced early in the next year. The school buildings with their gables, and the church with its lofty spire, will eventually form a group seen from Brierley, Midgley, and the surrounding country.

Newcastle-under-Lyne.—The foundation-stone of a new school for girls has been laid at Chesterton. The building will consist of a school-room, 50 ft. by 20 ft.; class-room, 15 ft. by 14 ft.; porch, lavatory, furnace for boiling water for tea, and the usual outbuildings and play-ground; to be built of red bricks, with stone traceried and mullioned windows; but the copings and buttress set-offs, usually done in stone, are to be of Staffordshire blue brick and tile ware. There will be open stained roofs covered with tiles. The style of the buildings will be Decorated Gothic, similar to the existing schools adjoining. The architects are Messrs. Ward & Son, of Hanley, and the contractor is Mr. Lea, of Chesterton.

Rothwell.—The new Free Grammar Schools

recently erected in Rothwell have been opened. The new edifice is situate at the east end of the town, on the site of the old school, and faces the street. It was built by Messrs. Barlow & Butlin, of Rothwell, builders, from a design by the rector. There is a residence for the master. The main building is capable of being divided by folding-doors into two large rooms, one being intended for girls and the other for boys. The boys' room is 40 ft. by 18 ft., and the girls' 38 ft. by 18 ft., and to each a class-room is attached. The height of the side walls is 15 ft. The roof is of open deal, stained and varnished. The school is lined with Harborough pressed bricks, the external material being "chopped" native stone, with white stone quoins. The estimated cost of the new building is 650*l.*, the materials of the old building having been utilised as far as possible. The school will accommodate upwards of 200 children.

York.—New church day and Sunday schools have been opened in the Walmgate district. A large plot of ground, of the value of more than 400*l.*, was placed at the disposal of the rector and churchwardens, on which to erect the schools. The ground for the parsonage-house, now in course of erection, near the schools, was purchased of the corporation for 300*l.* The schools, which are intended, as day, Sunday, and infant schools, with the addition, in winter, of night-classes, have been erected and fitted up in accordance with the rules laid down by the Committee of Council on Education, and consist of schools for boys, girls, and infants, each 36 ft. by 18 ft., with class-rooms adjoining. The front, towards the Church of St. Denis, is of red bricks and stone dressings. The play-grounds, which are spacious, are surrounded by a low wall and ornamental palisades. Mr. Rawlins Gould, of this city, was the architect employed, and the work has been executed by the following contractors:—Mr. Biscombe, for brick, stone, and plaster work; Messrs. W. Bellerby & Sons, joiner's work; Mr. T. F. Wood, slating; Mr. R. Walker, plumbing and glazing; Mr. W. Walker, ironwork; and Mr. Armitt, painting. The cost of erecting the buildings has been upwards of 1,400*l.* In the schools about 250 children, in the whole, can be accommodated. The interior woodwork and fittings consist of plain deal stained and varnished.

Tunbridge Wells.—The memorial stone of new schools has been laid here. Mr. J. Wimble is the architect, and Messrs. Willicombe & Oakley are the builders. There are at present between 200 and 300 children attending the school and eighteen teachers. One principal room will be 50 ft. by 25 ft.; the second room, 15 ft. by 15 ft.; over that and the staircase there are to be two more rooms, one for a young men's class and the other for a library, and at the back there will be two other rooms for the use of the church-keeper and the parsonage-house.

Leicester.—St. Martin's Schools have recently been much enlarged and extended by taking in the part formerly used as the master's residence, and bringing the front forward to the line of the street. Formerly there were only two common school-rooms, one for boys and the other for girls, but the alterations have added three good and airy rooms for classes to each department. The old part of the building has been renovated, new flooring having been laid down, and walls and panelling erected where required. The alterations and additions have been carried out under the direction of Messrs. Shenton & Baker, architects, at a cost of 1,250*l.*

Books Received.

Perpetuum Mobile; or, a History of the Search for Self-motive Power, from the Thirteenth to the Nineteenth Century. Second series. By Henry Dircks, C.E., LL.D., &c. London: Spon, Charing-cross. 1870.

Perhaps it may be something new to many of our readers to be told, that since the opening of the present century, and not a few of them quite recently, at least eighty-six English patents and twenty-three French ones, for perpetual motion, have been obtained, or at least asked for, in this country. Though actually for perpetual motion, these patents are in general said to be for the obtainment of "motive power." They are all, however, for the obtainment of self-motive power, by means of mechanical contrivances, combining levers, wheels, and weights, water and air, to go on for ever, or at least as long as the materials last, and without any continuous supply of motive power, such as winds or tides, steam, water-falls, &c., might afford. The true nature of these "motive power" patents we have now and then spoken of, and adduced as curiosities, but Mr. Dircks records them at considerable length, and a strange and lamentable exhibition of misused mechanical ingenuity they do form.

Amongst the more recent patentees (1865), we observe, is Mr. James Smith, of Liverpool, a practical man of business, if we mistake not, but also a noted squarer of the circle, about which he is ever and anon squaring up to ex-Professor de Morgan, the mathematician. Conjointly with some wrong-headed mechanic, Mr. Smith, as a capitalist, gives his name (and his money) to four patents, and one abortive application for a patent, for a self-moving engine to supplant the steam-engine; and on which, according to Mr. Dircks, he has spent between 8,000*l.* and 10,000*l.*, with the usual result of "wait a little longer." Baron von Rathen, who, a good many years since, endeavoured to bring into use an engine worked by compressed air in iron bottles, appears now (or at least in 1865) to have joined the corps of crazy self-motive power seekers, by taking out a patent for retaining the compressed air motor in perpetual activity by causing the engine itself to work an air-compressing apparatus.

Although, in general, the modern perpetual movement seekers keep the idea of self-motors discreetly in the background, so far as words are concerned, this is not always the case. Two poor French fellows, labouring under a twofold ignorance of the English language and of the laws of mechanics, boldly speak of their patent of 1867 as being for "the use of all kind of industry, and called the perpetual movement;" and they thus describe the application for provisional protection, which, however, was mercifully refused:—

> "This machine or apparatus is of triangular form, and has for motrical power the pression and force of a weight which keep continually raizing a smaller one, which is what constitute and produce its perpetual movement. Its march cannot be empeach by anny shoocks of anny kind whatever. Any system of escapement known can be applied and regulate its march and direct it at will. All kinds of connections can be applied to it according to the wants required. It can also be adapted to clocks."

In *Notes and Queries*, Mr. De Morgan thus vigorously defines the impossible problem of the perpetual motion:—

> "The purse of Fortunatus, which could always drop a penny out, though never a penny was put in, is a problem of the same kind. He who can construct this purse may construct a perpetual motion; in this way. Let him hang the purse upside down, and with the stream of pence which will flow out let him buy a strong steam-engine, and pay for keeping it at work day and night. Have a new steam-engine ready to be set in motion by the old one at its last gasp, and so on to all eternity. A perpetual motion demands of the nature of things a machine which shall always communicate momentum in the doing of some work, without ever being fed with any means of collecting momentum. It could be compassed in a certain way,—that is, by retaining the work done to do more work, which again should do more, and so on—if friction and other resistances could be abolished, and nothing thrown away. In this way the fall of a ton of water from a reservoir might be employed in pumping up as much water into another reservoir, which, when landed, if it be lawful to say so of water, might, by its subsequent fall, pump up an equal quantity into the original reservoir, and so on backwards and forwards, in *secula seculorum*. But not a drop must be wasted, whether by adhesion to the reservoir, by evaporation, by splashing, or in any way whatever. Every drop that falls down must be made to raise another drop to the same height. So long as the sockets have friction, or the air resists, this is impossible. In fact, matter, with respect to momentum, has the known qualities of a basket with respect to eggs, butter, garden-stuff, &c. No more can come out than was put in; and every quantity taken out requires as much more to be put in before the original state is restored. So soon as the law of matter is as clearly known as the law of the basket, there is an end of looking for the Perpetual Motion."

The history of perpetual motion, says Mr. Dircks, is a history of the fool-hardiness of either half-learned, or otherwise totally ignorant persons.* In the infancy of sciences, whether medicine, chemistry, agriculture, mechanics, or others, there were of course, some errors which received a certain amount of favour, and even encouragement; but the crudities of every science are fast disappearing.

Were we to admit for argument's sake that some delicately arranged instrument might possibly be contrived to show a tremulous action, its accomplishment would not be of the least practical value, or reward the toil and anxiety of its inventor. But although inventors have sought a power exceeding the steam-engine in some cases, while others have satisfied themselves with more lowly designs, based on capillary attraction, neither the one nor the other has attained the faintest shadow of success. From the infant machines projected in the thirteenth century to the last hydraulic, pneumatic, weighted, and lever-worked pretensions, patented as motions, no motion whatever has resulted from the one or the other to the present day. Not a solitary discovery is on record, not one absolutely ingenious scheme projected, or one simple self-motive model accomplished. Under such circumstances, what shall we say of the modern mechanic who shall hereafter presume to add his dreary dreams to the lifeless lumber of the last seven centuries? No language can be too severe in denouncing the continuance of research in this insane undertaking; nor any criticism too sarcastic in exposing the foolish results pompously published by a class of blind, deaf, and doggedly stupid projectors; who, bringing obloquy on themselves, are a discredit both to their country and to the present enlightened age. Nothing can excuse the fostering of such crazed conceits as the present history records, curious in themselves, as regards olden times, but ridiculous in a modern garb; they are, therefore, presented here as a warning to simple-minded experimenters and novices in mechanical science, in the hope thereby effectually to break the neck of this monster mechanical delusion.

Mr. Dircks's history is illustrated by engravings from various authentic sources, in papers, essays, letters, paragraphs, and numerous patent specifications, and is preceded by an interesting introductory essay.

A Short Historical and Architectural Account of Llanercost Priory. By R. S. Ferguson, Barrister-at-Law, and C. J. Ferguson, Architect. London: Bell & Daldy.

In the compass of a pamphlet the Messrs. Ferguson have given an interesting account of Llanercost, an Abbey of Black Canons, eight miles from Carlisle. The buildings are beautifully situated in the valley of the river Irthing, close to the Picts' wall, and are mostly of the thirteenth century. Two photographs of the buildings, and a measured plan, agreeably illustrate this welcome essay.

VARIORUM.

Mr. Allnutt's "Record and Historical Map of the War" shows the routes of the French and German armies, the situation of the battles, and the towns surrendered. It tells with a few lines and flags the tale of an astounding series of triumphs. The same gentleman also publishes a diagram showing the highest price of Consols each day during the war, from July 1 to September 30. The range is from 93¼ down to 88½. ——The October Number of *Home News for Australia*, 64 pages, is a remarkable digest of remarkable news, and reads like a volume of universal history.——The list of contributors to Mr. Tom Hood's *Comic Annual* this year will include, among other well-known authors, Mr. Leland (Hans Breitmann), whose contribution will be the first of his writings to appear originally in an English periodical. The Brothers Dalziell will execute the engravings. The result will doubtless be popular.

Miscellanea.

Parcels Trains.—The attention of the Post-office authorities is called, by the *Echo*, to the great want of a cheap parcels delivery throughout the country, so that, for a few pence, an interchange of commodities, in retail, might be promoted to an immense extent between towns, and especially by help of the halfpenny postage-card, of which tradesmen, as well as their customers, will make constant use. A Londoner, for example, wants a small roll of the tasty spiced mutton, or beef, freshly "cured," of which a Paisley tradesman advertises him by post-card. He cannot get it in London, except at enormous cost, and not fresh, from some West-end tradesman. He orders it from Paisley by post-card, or by enclosing stamps or order, and gets it next day, carriage 3d. or 6d. No end of such cases might be adduced.

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* And yet we find that the more recent patentees of whom we have just spoken comprise a colonial bishop, a professor of philosophy, and another of languages, two barons, a knight of the most noble and ancient order of the Temple, four military men, a doctor of medicine, a barrister, several gentlemen, two civil engineers, several mechanical engineers, a brass manufacturer, miller, millwright, smith, saddler, bobbin manufacturer, surveyor, and a geologist, besides others whose professions are not named.

The Architectural Society of Northampton.—The annual meeting of this society has been held. The proceedings of the day (and a very fine day it was) commenced with an excursion, the rendezvous being the Castle Ashby station. There the members from the west assembled. The train from the east end of the line coming later, there was time for the earlier comers to visit Earl's Barton, which was not in the programme. The party afterwards proceeded successively to Grendon, Strixton, Bozeat, Easton Maudit, Yardley Hastings, Castle Ashby, Whiston, and Cogenhoe. The meeting was held in the Assembly Room, the Rev. Lord Alwyne Compton in the chair. The report, which showed an unexpected surplus in hand, was read and adopted, and office-bearers elected. The Rev. Owen Davys then read a paper on the Choral Arrangement of Churches. Mr. Davys was of opinion that in cross churches the best place was in the centre, when the organ should be suspended as at Ely. When the choir is in the chancel, the organ should be placed behind it. He objected entirely to placing the organ on the ground. The musical effect was far superior from above than from below. The choir should be isolated from the congregation. The Rev. H. J. Bigge then read his paper "On the Connexion of Architecture with Freemasonry, and on Masons' Marks." The Rev. G. A. Poole denounced as a fallacy the supposition that the Freemasons of the Middle Ages had any connexion with modern Freemasonry. They were of no greater authority, he said, than the other guilds; and he repudiated the notion that modern Freemasonry had any title to take part in the religious ceremony connected with the laying the foundation of a church, when they were not in reality masons at all.

City Commission of Sewers.—On Tuesday the Streets Committee brought up a report recommending that the carriage-way of Moorgate-street and Finsbury-pavement should be paved with asphalte of three different descriptions. They stated that they had received applications from Mr. Barnett, the patentee of iron asphalte paving, and the Limmer Asphalte Company, to be allowed to lay down specimens of their asphalte, by way of experiment, in some parts of the city, and that in consequence they had considered it expedient to try in Moorgate-street and Finsbury-pavement those descriptions of asphalte and that of the Val de Travers Company, the thoroughfares having a different class and amount of traffic from that in Cheapside and the Poultry. The cost of the experiment would be 4,620*l.* in the case of the Val de Travers Company, who would have the largest space allotted, and 169*l.* in that of Mr. Barnett for a paving of 250 square yards. The Limmer Company offered to pave gratuitously 500 yards, and to keep it in repair for a year. The report created some discussion, and eventually an amendment by Mr. Deputy Farrar, postponing the consideration of the report for six months, was carried by a majority of ten in a Court of forty-four members. On the recommendation of the same committee, orders were given to pave with wood a portion of George-yard, Lombard-street, at the suggestion and expense of Messrs. Barclay, Bevan, & Co., the bankers.

Liverpool Master Builders' Association. The fourth annual general meeting of this association has been held at their rooms in South Crescent Chambers, Lord-street. The committee presented their annual report and balance-sheet, which were adopted. They congratulated the association upon its success in dealing with the labour question, which has brought the relationship between the great majority of the operatives and themselves into a more satisfactory state than has existed for many years. Should any dispute again arise in the bricklayers', masons', carpenters' and joiners', or painters' branches of the building trade, provision is made in the rules for referring such disputes for settlement to a public court of arbitration, instead of resorting to strikes or locks-out, as has hitherto been the practice. The following gentlemen were elected the officers for the year, viz.:—Mr. Edward Hughes, president; Mr. George Rome and Mr. Thomas Urmson, vice-presidents; Mr. James Landale, treasurer; Messrs. S. H. Holme, R. Makinson, S. Lyon, E. Gabbutt, C. Wells, James Leslie, Jones, W. Witter, J. Corkill, P. O'Connor, Thomas Harrison, John Tanner, W. Callaghan, T. Arrowsmith, John Price, W. Merrick, and D. Radcliffe.

Steam Cultivation.—A visit to Mr. Edmund Ruck's farms, at Braydon Manor, Charlhams, and Castle-hill, has been described in the *Wilts Standard*. The party, it is said, were wonderfully struck with the vast improvement both in the grass and the tillage. The tillage was in a beautiful state, principally due to steam cultivation, which was going on in force, on Fowler's system. Of the 300 acres, rather more than 150 acres are under steam cultivation for wheat crops, which Mr. Ruck believes the land capable of producing in good quality and quantity continuously, the crops after clover, beet, or beans not having been so good as wheat after wheat. At the time of the visit to Braydon, Messrs. Slatter & Porter's 10-horse double engine was at work on the land, having been there eighteen days, during which time it had ploughed the 150 acres nearly twice over, doing its work in a capital manner, and much to the satisfaction of both Mr. Ruck and his friends. It was interesting to witness the contrast between Mr. Ruck's farm and the lands adjoining, which are under the old-fashioned treatment; the visitors endorsing Mr. Ruck's opinion that all the poor land now lying in "Braydon Forest," and let at from 7*s.* 6*d.* per acre, may by means of the steam cultivator, and capital combined with skill, be made in a few years worth 2*l.* or 3*l.* per acre, and that some of the finest crops may be grown there, although it was a local proverb that "nothing good came out of Braydon."

The Drainage of Middlesbrough.—Mr. Robert Morgan, C.E., of the Local Government Act Office, has made his report upon the two schemes for the drainage of Middlesbrough. He says there are 7,000 houses in the borough, of which 406 only have water-closets, the remaining having covered ashpits. The ex-borough surveyor (Mr. John Dunning) estimates the cost of his scheme at 22,669*l.* 16*s.* 6*d.*, and the borough surveyor (Mr. Latham) estimates the cost of his scheme at 17,641*l.* 5*s.*; but to this sum must be added the cost of sewers in the north portion of the town, viz., 3,170*l.*, which makes the total 20,811*l.* 5*s.* After fully explaining the schemes, Mr. Morgan says,—"That of the two schemes before me Mr. Dunning's deals most comprehensively with the requirements of the town, and may, with certain modifications, additions, and combinations at certain points with Mr. Latham's scheme, be adopted with advantage by the Town Council." Mr. Morgan concludes his report as follows:—"I therefore recommend that Mr. Dunning's plan for the sewerage of Middlesbrough, with certain modifications, be adopted.'

City Offices Company.—An extraordinary general meeting of this company was held on Thursday in last week, at St. Clement's House, Clement's-lane, Mr. Ald. Dakin in the chair. The chairman, in moving the adoption of the report and accounts, said there was no material alteration in the balance-sheet except in one amount, which might be considered very satisfactory, received for surrender of the lease of the Cornhill premises. Those premises were held by the Crédit Foncier Company on a lease, of which $1\frac{3}{4}$ year had yet to run. The rent under that lease would amount to 11,375*l.* The Crédit Foncier manifested a great desire to surrender the lease, and ultimately their offer to pay 10,000*l.* and surrender was accepted. In addition to this, the City Offices Company had an accruing interest running over the period, which would bring in 500*l.* in addition. Within the last few days the ground-floor and basement of the premises had been let to a banking firm for 1,000*l.* a year, and the directors had great hopes that they would be enabled to let the remainder of the premises at a good rental.

A Water-tight Rain-Tank.—I took out the soil in breadth and depth the size I wanted my tank; I then laid a double course of brickbats, and ran Portland cement in among them till they were just covered; I then built up the sides with brickbats and Roman cement, and when the whole was finished, I coated the inside with a thin layer of Portland cement. Every bat, before it was laid, was dipped into a pail of water. The months of April, May, June, July, and August are the best months in which to construct such tanks, because the cement has the chance of getting firm before being rendered shaky by frost. Mine was made just about midsummer. I ought to say that it was not made for the purpose of catching rainwater, but for holding a daily supply of river water; but I am convinced the same principle of construction would apply to tanks for any purpose or position.—*Gardener's Chronicle.*

Irish Cairn Sculptures.—At the last meeting of the British Association, a paper "On Ancient Sculptures and Works of Art from Irish Cairns," by Dr. Conwell, was read. The author described an excursion which he made on June 9th, 1863, to the Loughcrew Hills, two miles from the town of Oldcastle, where he found the remains of thirty-one cairns, partially destroyed, no allusion to which could he find on the Ordnance maps. The rural population of the neighbourhood believed these heaps of stones to be the magical work of a witch. Fourteen of the cairns contained chamber stones richly covered with sculpture; in some cases the work being punched, and in others clearly and cleanly cut and engraved. He exhibited drawings of the devices; also a variety of curious articles in amber, bone, glass, bronze, iron, stone, &c. Dr. Conwell could give no explanation of the meaning of the numerous devices and symbols.

Sales of Land.—*Cockermouth.*—The Lorton Hall estates were sold by auction, under a decree of the Court of Chancery, at the Globe Hotel, Cockermouth. Lot 1, consisting of 109 acres, or thereabouts, situate near to Lorton Hall, and known as the Church Stile Estate, was sold for 6,010*l.* Lot 2, the Home Farm, containing 65 acres, was purchased for 3,750*l.* Lot 3, Capshows, consisting of 21 acres, was knocked down for 900*l.* Lot 4, Brooms, containing 23 acres 2 roods, was knocked down for 250*l.* Lot 5, Flatt, consisting of 6 acres, was purchased for 420*l.* Lot 7, Highside, consisting of 41 acres of arable, pasture, and wood land, and 64 acres of common land, was sold for 2,160*l.* *Swindon.*—Mr. Dore sold by auction a piece of land situate on the south side of the proposed new road leading to the Swindon railway Station, and immediately opposite the goods shed, containing 6*a.* 0*r.* 36*p.* The land previously offered, and belonging to the same estate, had sold in some cases as high as 10*l.* or 12*l.* a perch. Messrs. Thomas Arkell became the purchasers at 1,850*l.*

South Kensington School of Science and Art.—On Tuesday afternoon Dr. Zerffi commenced a new course of forty lectures on the Historical Development of Ornamental Art, in the Lecture Theatre of this institution. The lecturer said students would no longer receive merely practical instruction, which might have the effect of turning them into machines, but they would also be made thoroughly acquainted with the theory of art, in order to expand their minds and powers of production. He would endeavour, by avoiding all one-sidedness in the treatment of his subject, to give them the best of the realistic, historical, and critical schools; to develop in their minds a thorough knowledge of art, enabling them to arrive at originality.

The New Foreign Cattle Wharf.—Besides the large sheds for cattle, and the space for tying cattle in the open, there are pens for 2,500 sheep; and slaughterhouses and offices are being erected. There are three slaughterhouses, each of 60 ft. length by 30 ft. width, and seven houses, each of 48 ft. length by 16 ft. width, these being built of strong timber uprights and plates, with plank floors and walls, and the carcasses are suspended to stout beams, "crabs" being provided for hauling up the slaughtered cattle. The accommodation is said to be sufficient for the butchering of 700 cattle per day, and 1,600 sheep have been killed and dressed in a day.

Gathering of Public Servants, Coventry. A social gathering of public officers and servants of this city, was held at St. Mary's Hall last week. The city surveyor, Mr. E. J. Purnell, and his assistant, Mr. Whitley, jun., had arranged that a dinner should be given to the various men in the employ of the corporation, the expenses for which were raised by voluntary contributions, and the dinner was well served by Mr. Whitley, senior. The hall was decorated. Mr. Councillor Crutchlow occupied the chair, and Mr. Bird, master of the workhouse, the vice-chair.

Municipal Offices, Liverpool.—It was stated at a recent meeting of the Liverpool town council that the cost of the newly-erected municipal offices in that town was 162,637*l.*, including 33,000*l.* for the site, and that the annual expenditure on the establishment would be about 3,000*l.*

Cregeen's Sash and Casement Fasteners.—In these fasteners no spring is used. A hinged catch locks the fastener when in its place.

Building Trades' Institute for Technical Education.—On Tuesday evening the annual meeting of the Manchester and Salford Building Trades' Institute for Technical Education, took place at St. John's Schools, Gartside-street. The chair was taken by Mr. W. R. Corson; and there were also present Messrs. Jacob Bright, M.P., W. R. Callender, jun., Alderman Rumney, T. Clay, and others. The secretary then read the report, which stated that the industrial supremacy of England had been endangered for lack of knowledge, and that in spite of the practical aptitude of her people. It was therefore somewhat gratifying that though the number of members was not very large, yet there was reason to believe that the interest in the Institution was becoming more generally appreciated by those for whose benefit it was established, and that the session that was about to commence would be an improvement on the last.

The Technical Education Movement.—The deputation from a committee of a proposed university for technical education has had interviews with the Lord Mayor at the Mansion House. At the last interview, Mr. Alderman Gould explained that the deputation had brought up their report in an amended form. The amended report was read by Dr. Mill, and the Lord Mayor having expressed his approval of it, he was requested to allow his name to be put down as chairman of the executive committee, and to call a public meeting. In reply, his lordship said he had no objection to try the experiment, and by holding a meeting they would be able to ascertain whether the public were with them. If the public were not with them, they must wait till they were.

Ruyton Towers, Salop.—The owner of this castle presided in person at a dinner which he gave to eighty workmen and others, in celebration of the completion of the centre and left wing of the building, on Monday last. The building is somewhat Norman in character, and is erected with red sandstone, in massive proportions. The architect, Mr. Harry Percival, of Newchurch, in Rossendale, put in half a mile of railway to a quarry which he opened on the estate, and he has erected the structure without external scaffolding, and by the aid of ordinary workmen in the locality. The great hall and marble staircase, with a bold window of six lights thereon, by O'Connor, of London, are chief features.

A Draughtsman to Liverpool Council.—At a recent meeting of the Liverpool Town Council, Mr. Alderman Weightman moved the adoption of the following recommendation, agreed to by the improvement committee:—

"To appoint Mr. Edward Rake as draughtsman, to prepare the necessary drawings, &c., for the lodges, entrances, and bridges, at Sefton Park, at a salary of 7*l.* per month, subject to one month's notice."

Mr. Fairhurst remarked that there were five draughtsmen in the borough engineer's office who were under notice to quit, and he thought that one of them should get the situation. After some further conversation, Mr. Weightman withdrew the recommendation for the present.

Laying the Memorial Stone of the Church of St. Columb, Omagh.—The Duke of Abercorn laid the memorial stone of the parish church of St. Columb, Omagh, on Saturday, 8th, in the presence of a large number of the parishioners of Drumragh. The total cost of the building will amount to about 5,400*l*, the greater part of which sum has been contributed by the parishioners, the balance being a grant made by the late Ecclesiastical Commissioners for Ireland. The Duke addressed the meeting.

Large Transactions.—The report of the directors of the Conservative Land Society, submitted to the shareholders, at the meeting on 10th inst., at the Norfolk-street Offices, gives the receipts for the quarter, which were 36,693*l*. 7s.; for the financial year ended at Michaelmas, 133,276*l*. 15s. 11d.; and the grand totals, 1,583,359*l*. 15s. 2d. The withdrawals were 399,971*l*. 3s. 9d. The reserve fund is 10,500*l*. The auditors were re-elected, and the report adopted. Viscount Ranelagh occupied the chair.

Chairmanship of Board of Works.—The *Parochial Critic* prints the circular letter of five applicants for the appointment, viz.:—Mr. C. Westerton, Mr. Robert Freeman, Mr. P. H. Le Breton, Mr. John Savage, and Lord Robert Montague.

The South London Tramways.—The tramway from Brixton to the Westminster-road, the present terminus being at the corner of Hercules Buildings, opposite to the Female Orphan Asylum, has been opened for public traffic; the carriages, which will hold forty-six persons inside and out, and be drawn by two horses, running every five minutes. If the tramway fare is to be kept at 2d. for the above distance of a mile, the omnibuses will not have any reason to fear the competition.

The Fungus Show at the Royal Horticultural Society, on the 5th inst., proved very attractive. Notwithstanding the drought, a great many fine and curious specimens were exhibited; and as there was no collection in the first class, which was confined to edible fungi, the prizes were awarded to Mr. G. Worthington Smith and Mr. James English, whose collections were considered of equal merit, while the second prize was given to Mr. Hoyle.

TENDERS.

For laying out land at Worthing. Mr. Alexander Peebles, architect:—

Carrington	£4,550	0	0!
Peacock	2,782	17	8
Carter	1,830	0	0
Dyne	1,600	0	0
Blaker	1,498	0	0
Haynes	1,449	0	0
Blackmore	1,449	0	0
Hubbard	1,439	0	0
Pizzey	1,400	0	0
Cole	1,334	0	0
Vickers & Crane	1,316	0	0
Clarke	1,177	0	0!

For farm buildings, Ramsbury, Wilts, for Mr. C. Lanfear. Mr. Jas. H. Money, architect:—

Cruse	£1,175	17	0
Dyer	1,045	0	0
Simonds	975	0	0

For farm homestead, Standen Farm, Wilts, for Mrs. General Dunn. Mr. Jas. H. Money, architect:—

Dyer	£2,666	0	0
Wooldridge	2,196	0	0

For the erection of new entrance-lodge to Hughenden Park, Bucks, for the Right Hon. B. Disraeli, M.P. Mr. Arthur Vernon, architect:—

Loosley	£410	0	0
Nightingale	385	0	0
Corby	381	0	0
Spicer	375	0	0
Reavell	345	0	0
Woodbridge	340	0	0
Almond	330	0	0
Nash	316	0	0
Cooper (accepted)	298	10	0
Johnson	270	18	6

For Primitive Methodist Chapel, Lincoln-street, Hull. Mr. Musgrave, architect:—

Clarkson	£2,734	0	0
Skinner	2,694	0	0
Jackson	2,600	0	0
N. & J. Hall	2,440	0	0
Musgrave	2,400	0	0
Robinson (accepted)	2,380	0	0
Sergeant (too late)	2,360	0	0

For the erection of a dwelling-house and stable, for Mr. George Allen, in Victoria-road, Romford. Mr. E. C. Allam, architect. Quantities supplied:—

Gordon	£657	0	0
Hinds	558	0	0
Davey	556	0	0
White (accepted)	507	0	0

For the erection of a minister's house, for the Congregational Church, in the Western-road, Romford. Mr. E. C. Allam, architect. Quantities supplied:—

White	£776	0	0
Nightingale	670	0	0
Hamlin	644	0	0
Wright	623	0	0
Hinds	617	10	0
Reed	597	0	0
Poulson	587	0	0
Blease	586	0	0
Holmes	585	0	0
Warr	583	0	0
Davey (accepted)	559	10	0
Death	558	2	6

For the erection of a dispensary, relief offices, workrooms, &c., at Notting-hill, for the Kensington Board of Guardians. Messrs. James Broadbridge & Josiah Houle, architects:—

Lot, Brass, & Son	£10,289	0	0
R. & T. Pargetter	9,850	0	0
Saul	9,398	0	0
Markwick & Thurgood	9,288	0	0
J. & S. Williams	9,250	0	0
Crockett	9,193	0	0
J. & A. Wright	9,163	0	0
Chappell	9,091	0	0
Wigmore	8,985	14	6
Henshaw	8,975	0	0
Scrivener & White	8,889	0	0
Langmead & Way	8,800	0	0
Cowland	8,775	0	0
Temple & Foster	8,745	0	0
Hill, Keddell, & Waldram	8,580	0	0
Hockley	8,397	0	0
Foster	8,298	0	0

For New Congregational Church, Reading. Messrs. W. & J. T. Brown, architects:—

Contract No. 1.—*Schools.*

Sheppard	£885	0	0
Wheeler Bros.	850	0	0
Grover	836	0	0
Woodruffe	800	0	0
Barnicoat	765	10	0
Matthews (accepted)	757	0	0

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Erratum.—Letter in last, "Man the Boats," should commence "Suppose a block to have six *axles*,"—not "angles," as printed.

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(Signed) J. M. Drago,
Treasurer of the National Government.
Jose Tomas Rojo.
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